Electricity on the Farm

A Monthly Magazine for the Progressive Rural Family

JUN 8 1931
U. S. Department of Agriculture

JUNE, 1931

MERCHANDISING EDITION

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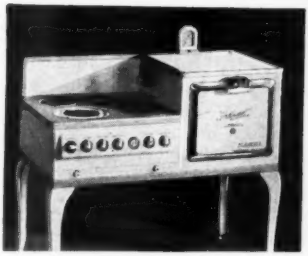

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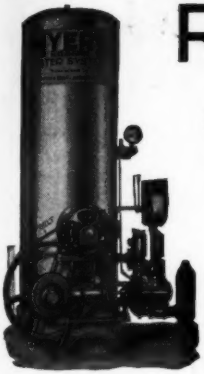

Fig. 2510
Shallow Well System

Fig. 2621
Deep Well System

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Fig. 2557
Self-Lubricating Pump Jack

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Electricity on the Farm

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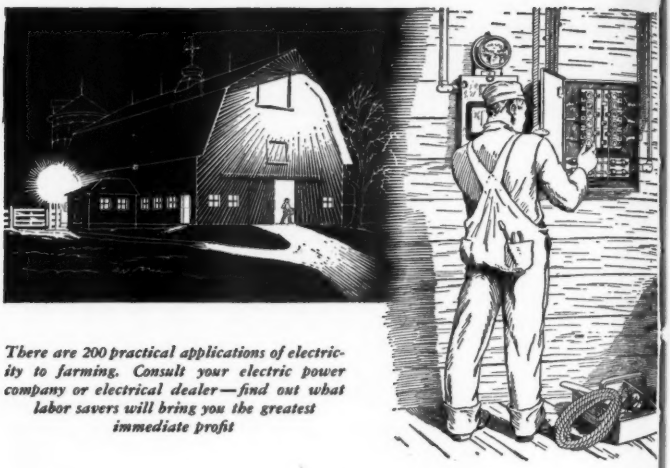

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GENERAL ELECTRIC

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Refrigerator Size

Many dairymen, who last year depended upon natural ice, are this year confronted with the necessity of artificial refrigeration. A mild winter prevented the storage of natural ice and milk regulations are becoming more exacting. In addition, many other dairymen have come to recognize the advantages of electrical refrigeration over natural ice cooling, and they, too, will be in the market for refrigerators.

Investigations of complaints with electrical refrigeration in farm dairies have shown that difficulties encountered are almost entirely due to using too small a refrigerating unit for the amount of milk cooled. This, in turn, is the result of trying to economize when purchasing the initial installation.

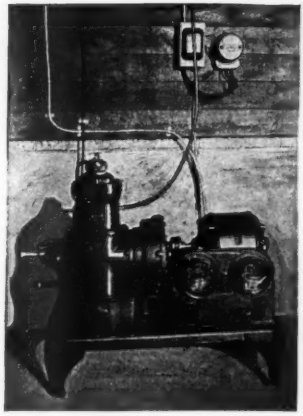
Experience indicates that the refrigerator compressor should have a capacity of 7 to 10 pounds of ice in 24 hours for every gallon of milk cooled per day. Thus a dairy whose maximum production is limited to 200 quarts a day will require a 1-4 ton refrigerating system.

As to the type of refrigerators, the dairymen who wholesale milk in cans will usually decide on an immersion tank cooling system; the dairyman doing a retail milk business or one who wishes to be in a position to readily meet market changes will install the dry box system.

It is a safe practice to discuss fully with the manufacturer of refrigerating equipment your needs and depend upon his judgment as to the equipment you require. In addition to manufacturers representatives, your power company can be of material help to you in this respect. Finally, it is always better to secure a little greater capacity than your immediate needs would indicate for the likelihood is that you will gradually increase your production instead of decreasing it.

SWEET MILK

By E. R. MEACHAM



This unit keeps Mr. Hoppert's dry storage room cold

WHEN everybody had a cow, keeping the milk sweet was a family affair. Good housekepers had to be good dairymaids, and if they were careless with their milk pails and the milk turned sour, it was, after all, nobody's business but their own. But since the family cow has gone and milk comes in bottles instead of the original container, the men who sell it have learned that their success depends on how long that milk will stay sweet.

This is definitely a farm problem. The man who runs a small retail dairy, and the man who sells his cream, as well as the man who sells whole milk for some one else to bottle and retail, are all engaged in the job of keeping milk sweet.

First Requirements

The first three steps in solving the problem are, of course, healthy cows, clean barns and carefully washed and sterilized cans and pails. Strict attention to these three things will insure milk with a relatively small number of bacteria to begin with, but the only practical way to prevent the rapid multiplication of these bacteria is to chill the milk immediately and to keep it cold until it reaches the customer. Farmers' Bulletin 976 says: "Dairymen lose millions of dollars annually because of poorly cooled milk and cream."

Cooling in the old spring house, in the horse trough, and even over the modern aerator with well water are steps in the right direction, but they do not go far enough to insure satisfaction. Ice, of course, gives lower temperatures than water, but it costs money to harvest, haul and store ice in the winter and it takes a lot of labor to use it in the summer. Mechanical refrigeration greatly simplifies the job of preventing the growth of bacteria in milk by keeping it cold.

Producing cold by machinery is a good deal like taking up water with a sponge. All the mechanical coolers use as a refrigerant some substance that will change from a liquid to a gas at a very low temperature. It boils just as water boils when it changes from a liquid to steam, but the refrigerant may make the change from a liquid to a gas at zero or even below instead of at 212 degrees. Like water it takes up a lot of heat when it becomes a gas and because the boiling point is so low it will absorb this heat even if its surroundings are already pretty cold. Compressing the refrigerating gas brings out this heat and, if the heat is carried away either by air or water, the gas turns back to a liquid again ready to absorb more heat. That's all there is to the

principle of mechanical cooling.

The equipment to accomplish it differs widely in form and appearance, but generally includes the same essential parts; a motor, a pump, a condenser and cooling coils.

The motor runs the pump. The pump draws the refrigerating gas from the cooling coils, compresses it, and delivers it to the condenser. In the air-cooled units the condenser looks like an automobile radiator. Its purpose actually is to radiate heat and there is usually a fan to draw the air through it. The cooling or expansion coils are in the tank or storage chamber to be cooled. They take up the heat that is in the milk or that leaks into the place where it is stored. But in doing so they do not get hot. The heat is absorbed in changing the refrigerating liquid to a gas without raising the temperature. These expansion coils are always colder than their surroundings. It is in the compressing of this gas into a small space that makes the absorbed heat appear as a higher temperature, and then the condenser gives it up to the surrounding air or water and gets rid of it altogether just as squeezing a sponge or wringing a mop gets rid of the water it has absorbed.

The best way to apply mechanical cooling to the job of keeping milk fresh and sweet depends on how the milk is handled.

Henry Vorpagel of Lake Geneva, Wisconsin, sends the milk from his herd of ten to fourteen cows to the Borden Plant. He is one of a large group of farmers using electric refrigeration to produce "selected milk" for which they get a premium of 40 cents a hundred pounds above the price of ordinary milk whenever their milk contains less than 10,000 bacteria per cubic centimeter or 25 cents a hundred if the bacteria count is between 10,000 and 25,000. He feels that electric cooling is profitable even with a small herd.

Mr. Vorpagel's cooler is a tank of water in the milk house. His motor, compressor, condenser and fan are all mounted on a 12-inch plank that lies across the middle of the tank and rests on the two side walls. His cooling coils in which the refrigerant expands are suspended in the water from the lower side of the plank. A metal grating protects these pipes from

The big storage box where Mr. Hanold keeps cream and meat

injury. On each side of the cooling unit there is room for two cans and heavy insulated doors fit down over them. Ice freezes onto the expansion coil until it forms a solid block.

"When we bring up the first can of milk from the barn," said Mr. Vorpagel, "generally about half past six, we turn on the current. When we are through milking at seven, ice has already begun to form on the coils in the tank. We leave the current turned on until one o'clock at night. Then this time-switch turns it off." He pointed as he spoke to an automatic timer on the wall. It is a device that works like an alarm clock, only it is set to pull a switch rather than ring a bell.

"After the morning's milking, we put the cans in the tank, feed the cows and go into the house for breakfast. When we come out again that milk is cool enough to take into the plant."

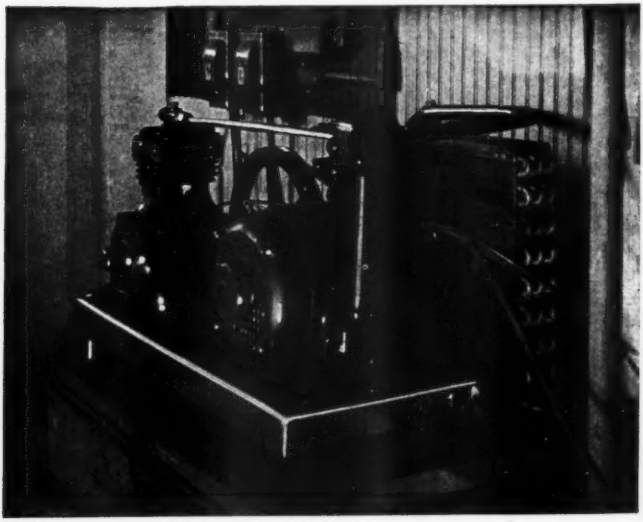
If they have more than four cans of milk, they set out some of the night's milk while they are cooling the morning's milking.

This little outfit cost Mr. Vorpagel $335.00. The refrigerating machine cost $300.00. The clock cost $19.00.

Mr. Vorpagel feels that electric refrigeration is cheaper than ice.

"It doesn't cost half as much," he said, "and it doesn't take anything like the work. The last summer I used ice, I had to pay $10.00 for the ice, and $21.00 for the truck to haul it from the lake to my ice house. It took five men a good long day to pack it in. I didn't begrudge them $4.00 a day for that work, but that was $20.00 more on the cost of the ice, or $51.00 all told.

"And all summer long we had the job of digging it out, and washing off the sawdust, then hauling it over to the cooling tank. And on top of all that, the ice house was not big enough to hold all I needed for the whole summer. Along toward the last I had to buy about a ton a week at $4.00 a ton,



The motor driven compressor and the condenser at the Bekkedahl Farms

and I had to haul it out myself. So that took a lot of extra work and time."

Nearer to Lake Geneva are the Bekkedahl Farms. They have a much larger herd, but use the same general method of refrigeration with equipment of a different make. Here the cooling coils in the covered tank are a standard type of cast-iron radiators which are not likely to be damaged by the milk cans.

Stirring Increases Capacity

The tank also contains a motor-driven agitator much like a small boat propeller. They find that stirring the water increases the capacity of the cooler by hastening the cooling process. But stirring the milk is not recommended because it offers another chance for the introduction of bacteria.

At the Bekkedahl Farms all of the cooling outfit except the expansion coils and agitator in the tank is located in a room adjoining the one in which milk is handled, but just through the partition from the cooling tank. This equipment is shown in the accompanying picture.

For the local dairyman bottling his milk, electric refrigeration is applied a little differently. Mr. Martin Hoppert, who sells milk in Sheboygan, Wisconsin, turned his old ice chest into a modern cold-storage room. In his old ice bunker he put a brine tank, and in the brine tank he put the expansion coils of an electric machine whose capacity is equal to one-third of a ton of ice each day. The so-called brine is not salt and water, but calcium chloride and water, which can be cooled to a very low temperature without freezing.

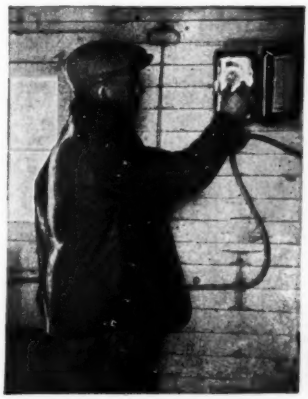
Mr. Hoppert is particularly careful of the quantity of his milk. When it comes up to the dairy house from the barn, he runs it over an aerator cooled with water pumped from a spring and bottles it right away.

"I never let milk stand in tin cans or pails," says Mr. Hoppert. "I bottle it just as it comes from the cooler, and put it into the cold room so it is chilled and stored in the glass bottles until we are ready to deliver it."

Mr. Hoppert estimates that during the warmer months he uses about 230 kw. hrs. a month to keep his milk cool enough to retard bacterial growth. If he did not have such cold spring water he could still chill the milk immediately by pumping brine that is colder than ice through his aerator from his brine tank and back into the tank again. The main thing is to get this tank big enough so that it will hold plenty of brine for cooling as well as storing the milk. Four gallons of brine for each gallon of milk a day should be ample.

George Hanold, who lives just a few miles out of Richland Center, has a little different problem. He sells cream in bulk to a local butcher, who bottles it and sells it in his shop. The butcher sends for the cream, so Mr. Hanold has nothing to do with it after it leaves the farm. But, of course, he is under the constant necessity of keeping small amounts of cream sweet for several days, and that requires somewhat different equipment.

He used to cool and store this cream in an ice box big enough to hold 300 pounds of ice at once.



Lawrence Vorpagel sets the time switch to turn off the cooler

But even that large supply could not maintain a cold constant enough to keep the cream sweet for more than a day or two. Then if a shifting demand left him with an extra supply, he was sure to have more sour cream than they could use up.

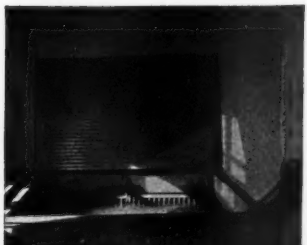
That was one of the reasons why Mr. Hanold first considered mechanical refrigeration. But he also wanted a place for the safe keeping of fresh meats.

He looked about at the commercial boxes in the market, but none of them seemed to be just what he wanted. So he decided to build his own cabinet. He planned about what he would like, then the local refrigerator salesman and a carpenter from town worked with him to build it.

When they got through he had a sturdy substantial box built right into the corner of his separator room in a building about thirty feet away from the house. The box is nine feet long, five feet high, and three feet from front to back. The double walls are six inches thick and filled with ground cork for insulation. The doors, too, are thick and well insulated. They fit tight to the box, held in place by heavy latches.

Operates Household Box

There are three parts to the box; at each end is a big storage chamber; in the middle is a space for the cooling coils and for six big freezing trays. Altogether it has seventy cubic feet of storage space.



Cast iron cooling coils and motor driven agitator in an insulated tank

It cost $170.00 to build it.

But this is only part of the cooling job Mr. Hanold makes his refrigerating machine do. His wife had a good household refrigerator in the kitchen, but if they were going to stop using ice out in the dairy cooler, it looked rather bad for the supply indoors. So he decided to cool both boxes at once.

Experience has proved that he can do that very nicely. He put the one-half horsepower motor with the compressor and condenser in his basement right under the household refrigerator and ran one set of pipes straight up to it.

The pipes for the dairy cooler he laid far enough under ground so they are safe from changes in temperature and mechanical injury. It took 70 feet of pipe to reach the cabinets from the compressor.

The cost of the whole outfit, box, refrigerating units, copper pipe and labor was $795.00.

Costs Less Than Ice

Mr. Hanold estimates that it costs him about 100 kw. hrs. a month to cool both of these boxes in the warm weather. That is considerably cheaper than his former ice bill. He used to pay $80.00 to have his ice put up each year.

The saving in labor amounts to a good deal, too. Lifting and hauling ice every day used to take a lot of time and temper, and was a wet, uncomfortable job.

Whether it be a "shot gun" can of cream to be kept sweet a week, or 500 quarts of milk to be instantly chilled for immediate bottling and delivery or 50 gallons in cans to be stored over night, machanical refrigeration can handle the job. To secure a satisfactory solution to each problem it is only necessary to select the equipment designed for that particular work.

"He who would do some great thing in this short life must apply himself to work with such a concentration of his forces as, to idle spectators, who live only to amuse themselves, looks like insanity."—Parkman.

TAKING ARM ACHES

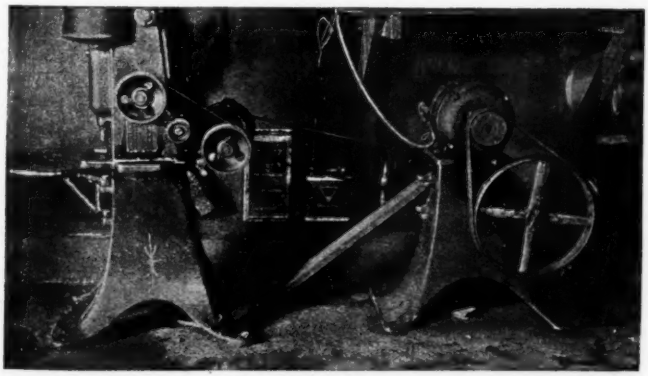
Out of the Cream Separator

By FRANK J. ZINK

Member—American Society of Agricultural Engineers

JUST consider the time spent turning a cream separator by hand to skim the milk from ten average dairly cows. We will say these ten cows produce during a year 50,000 pounds of milk. To separate 50,000 pounds at one time would require but fifty hours running time where a 1,000-pound per hour capacity cream separator were used. But where the milk is separated night and morning for 365 days, many hours have to be added to these fifty to account for the time in bringing the separator up to speed. Approximately 75 hours time will be required to

The little motor just behind the separator does the work while Mr. Boehnke finished milking or feeds the skim milk



Mr. Frank Wetterling of Ventura, Iowa, uses this portable drive for his cream separator. He eliminates hours of labor at a cost of a few cents per hour

separate this amount of milk. Sev- eight-hour days. Who wants to eigh-hour days. Who wants to spend 9½ days during any year turning a cream separator?

Where electricity is available, a small motor will save those 9½ days for more productive work, or for nothing else than to sit and watch the motor do the job, giving one that pride which comes from directing power instead of actually furnishing it.

On the expenditure which will equip the usual cream separator with an electric motor drive, the annual carrying charges will be approximately $8.40 which will cover interest, depreciation and maintenance. The power required to separate 50,000 pounds of milk will be about 15 kilowatt hours, which at a rate of six cents per kilowatt hour will cost ninety cents. What a small cost this is! The total cost is then $9.30 for an entire year. Could 75 hours man labor be hired for so little?

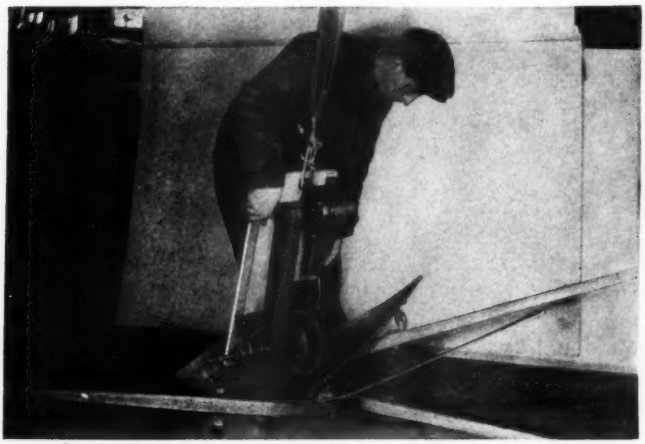
Twenty-one hours of labor at forty cents per hour costs $8.40. To separate the milk from three cows each producing 5,000 pounds of milk annually would require about 21 hours. Therefore, the electric drive will be economical for a herd as small as three or four average producing cows. With the larger herds the profits increase accordingly as more labor is saved and the carrying charges remain approximately the same.

Wherever possible it is best to purchase the electric power attachment regularly manufactured and sold for use with the separator. These are almost always available through the same dealer from whom the cream separator was originally purchased.

Polishing the Plow With An Electric Tool Grinder

By Geo. W. Kable

The Rural Engineering Department of Cornell University has done a fine job in developing a handy farm tool grinder. Here is a new use for it in polishing a plow. As shown in the picture, the stone is replaced with a wire brush. A small rope is tied around one leg of the motor and to an old inner tube. The inner tube is tied to an overhead beam. It carries the weight of the grinder and motor and makes it easy to handle.



Wire Brush on Portable Grinder Does Fast Work in Polishing Plow

WATER RANKS FIRST

In Giving Health, Comfort, and Profit on the Farm

By J. C. SCOTT

A cup of water at Fez, Morocco, (Africa) costs one-fifth cent, to say nothing of its purity. It is peddled in goatskin sacks

HOW can the farm home be put on a par in health, beauty and comfort with the city home?

Water—plenty of fresh running water, under pressure, always on tap—will come nearer putting the farm home on an equal basis with the city home with regard to comforts and conveniences than any other one thing.

Besides the comforts, a water pressure system pays good dividends on the investment, too. It requires about 465 gallons of water a day for the farm where there are five persons and live stock equal to eight cows, six horses, twenty-five hogs and twenty-five sheep. To pump 465 gallons of water by hand ordinarily takes nearly two hours. In one year, 706 hours would be spent in pumping this much water, besides all the time and hard work required to carry much of it. At 10 cents an hour, the cost would be $282.00 a year to pump the water.

A Labor Saver in the Home

But only the surface has been scratched in estimating the time, waste and extra work on farms without running water and well placed plumbing conveniences. Home economics experts claim that the average housewife can reduce her work by having running water in the home and by properly placing sink, table, stove and cupboard in the right relation to each other.

On most farms without convenient running water, health, as well as comfort, is impaired. Doctor bills increase. Public health investigations, carefully checked, show that four in twenty babies die in homes without running water, while only one and three-sevenths in twenty die in homes with running water, indoor toilet and septic tanks. Adult health and efficiency in work are also seriously affected by insufficient water.

Stock Need Plenty of Water

When pumping and carrying water is done by hand, requiring considerable time, the amount of water given stock is often reduced and farm profits are directly affected. Experiments have proven that cows give five to eight per cent more milk when fresh water is always available. To show a maximum profit, it is essential for the dairyman to make this provision. With plenty of fresh water horses do better and stay in condition easier; beef cattle and hogs

Pure water is scarce in rural India

Open wells facilitate the getting of water, but there's nothing to keep insects and small animals out. Earthenware jugs are used to transport water to homes.

fatten quicker; and hens lay more eggs.

The home is more beautiful with flowers and green grass in the lawn, so easy to keep up where there is an electric pumping plant to supply the water.

And the cost to operate an electric farm pumping plant is much less than the same amount of water would cost in the city.

Youth's Vision of Farming

Too much stress cannot be laid upon the benefits which are resulting from the training of our farm youth in agriculture. Lessons learned today by high school boys who are making laboratories of their dads' farms, will have a stabilizing influence on the prosperity of agriculture.

High school agricultural training does not center on any particular phase of farming. Leaders are taking steps to broaden out the work in each needed direction. One study which is being given a more and more important place is that of proper application of equipment. Farm youth take readily to this phase of farming.

Consider Lloyd Criswell, a farm boy near Hastings, Nebraska, who won the public speaking competition at a vocational agriculture meeting held at the College of Agriculture, at Lincoln, Nebraska, last spring. The subject of his talk was "Power Farming and Its Effect Upon Agriculture."

Commenting upon his farm experience a short time ago, Lloyd Criswell said, "I speak from experience when I say that power machinery has emancipated the farmer and his family. I think that the rapid development of farm equipment has lifted an enormous burden from American agricultural people. This has been brought about by the use of the combine, tractor, corn binder and picker and many other machines which have aided to place agriculture on a more nearly equal basis with all other professions in the American industrial world."

Convenience
Cleanliness
and Low Cost
Win Friends for

ELECTRICAL REFRIGERATION

By MARTHA E. WARNER
Clintonville, Conn.

RECENTLY, while visiting friends in Pennsylvania, I was asked to give an informal talk on the subject of Electrical Refrigeration to the members of a Woman's Club.

Now it so happened that each and every member of this club still clung to her old ice box; not from choice exactly, but she was skeptical, for she had been told by some one that the expense of operating an electrical refrigerator was beyond the average household budget.

Not knowing all this until the meeting was over, I started in and talked to the ladies about the benefits of modern refrigeration; the saving of food and milk; the ever ready supply of ice cubes; the delicious frozen dishes that could be made; the relief in knowing that food and drink kept well below the 50 degree bacterial danger point was safe and wholesome; and I closed my talk by telling them that the electric refrigerator was quiet in operation, economical, and dependable. No drip pans to empty, or to forget to empty, no mussy icemen to clean up after. In fact, it was a faithful servant which would serve one month in and month out, year in and year out, with very little attention.

When the meeting was thrown open for questions, one woman said: *"I am convinced that electric refrigerators are the latest word in refrigeration; but I am not convinced they are economical. Your saying that they are proves nothing to me. What I want to know is, how much in dollars and cents it costs per month for current to operate one. I know what it costs me for ice and I would like to know how that expense compares with the expense of the electric refrigerator."*

A Six Months' Test

I was glad to be able to tell this woman that for the six summer months—and you know they have been hot ones—from the first of May to the first of November, I tested out my refrigerator with a small meter, and found that it had used 218 kilowatt hours of current. As for the dollars and cents part of it, that would depend entirely upon the rates her electric company charged. Some companies had a flat rate, and others a graduating scale. Our company's

charges were of the graduating kind, beginning at eleven cents and decreasing with increased use of current.

Figures Tell the Story

During the discussion that followed, I noticed that this woman was busy with paper and pencil. Presently she exclaimed, "Electricity has won." Then she went on to tell us that her ice bill was around $2.50 or $2.75 per month, and for the six months would not be less than $16.00; while the 218 kilowatt hours of current at, for example, a rate of five cents would only cost her $10.90.

That seemed to settle the matter for her, for she said later: *"We have to have a new refrigerator of some kind for another year; but have hesitated about buying an electric because we had been told they were so expensive to operate; but we shall hesitate no longer, for I am now convinced that it is a good business, money saving, proposition."*

And that is exactly what it is, only people are loath to believe it.

Well, my little talk that day at the Woman's Club was the means of converting one doubting Thomas, and here's hoping that others of the members will follow her example, ever remembering that there are times when it is wise to save money by spending it, and especially is it true when it is done in the effort to safeguard the health of one's family.

Drinking Cups For Cows

Among farm animals, dairy cows require the largest amount of water because it forms 87 per cent of the milk they yield. It has been found that cows in milk drink four times as much water as when they are dry.

In tests at Iowa State College it was found that cows watered in drinking cups consumed 18 per cent more water and produced 6 per cent more milk and 12 per cent more butterfat than did the cows which were watered twice daily in an outside tank. It was also discovered that the cows inside took an average of 10 drinks per day, that they consumed 63 per cent of the daily water consumption after 5 p. m. and before 5 a. m. of each day, and that their appetites were improved.

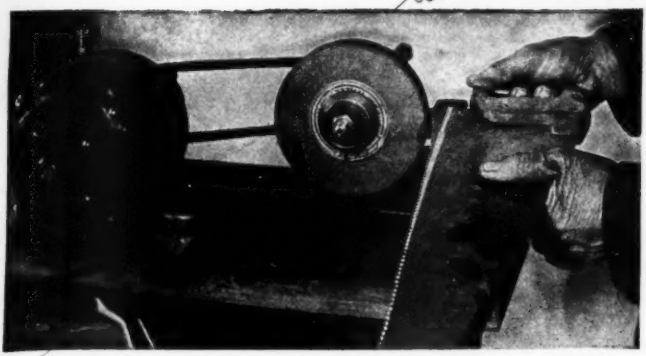
Dairymen Find Drinking Cups for Cows Profitable

A number of South Dakota dairymen, have found it profitable to instal water bowls or drinking cups in the dairy barn, allowing the cows to drink at any time while they are stanchioned in the barn.

E. N. Trooien of Astoria, South Dakota, installed a water system for his dairy herd at a cost of $100. The system includes a storage tank of 600 gallons capacity, 11 drinking cups, piping to carry the water from the well outside to the storage tank in the barn and piping to distribute the water from the storage tank to the individual cups. Mr. Tooien suspended the storage tank from the joists at the ceiling above the cows between the stanchion line and the gutter. He found that his water system resulted in greater use of water, in increased milk production, in greater convenience in supplying water to the herd and in a saving of labor.

Barn Must Be Warm

Drinking cups will not prove satisfactory unless the barn can be kept sufficiently warm to keep the temperature above the freezing point most of the time. If no water pressure system is available on the farm it is possible to place a storage tank in the barn just below the ceiling or just above it in the haymow. Many farmers use the following system to pump the water into the supply tank: The pump is packed so water can be forced up through a perpendicular pipe to an altitude 5 or 6 feet above the top of the supply tank in the barn. A horizontal pipe connects the perpendicular pipe and the tank, and if this pipe is given considerable drop toward the tank it will drain dry and prevent any difficulty from freezing.



TRUING AND FILING
a Crosscut Handsaw

By L. M. ROEHL

THE power grinder makes it possible to do work in saw fitting that cannot be done satisfactorilly in any other way. The picture shows its use in straightening the cutting edge of a crosscut hand saw that had been filed for many years but never properly jointed so that the edge was kept straight.

As shown in the picture, a line was drawn with a piece of chalk thus showing the amount of metal that needed to be ground off. In case chalk is not at hand a line may be made with a soft lead pencil.

The tool rest of the grinder was placed close to the grinding wheel and just below the center so as to prevent the chattering that would occur if the saw blade were held above the center. Most of the metal may be ground off by holding the blade free-hand but a tool rest in the above position is necessary to bring the edge approximately to line. In the grinding operation, the blade is held against the saw lightly and moved right and left to prevent heating the blade.

After the blade has been ground as close to the line as possible, it is placed in a metal vise or saw clamp with the saw teeth above the jaws of the clamp or vise at least an inch and one-half. The edge is then trued up by using a flat file. The worker stands at the handle end of the saw and moves a side of the file lengthwise of the saw. The file is held in both hands with the thumbs on the file pointing away from the worker and the index fingers held under the file pointing toward him. By holding the file this way it is easy to hold it at right angles to the sides of the blade. The file is pushed over the blade as many times as are necessary to touch the tips of all of the teeth and to true up the edge where it was ground. This process is called jointing the saw. To see that all points have been hit with the file, the blade is held toward a window or light so that the light will show the bright, shiny surfaces on the points of the teeth. If any of the teeth have not been touched by the file the process needs to be continued until all are hit and thus brought to the same plane.

The next step is spacing out

new teeth on the part of the saw where the old teeth have been ground away. Count the number of teeth to the inch on the saw. Lay the saw flat on the bench, preferably before a window and place the steel square or ruler on the blade. The teeth are then spaced and marked where needed. If chalk is available the blade of the saw is chalked. The markings thus show up more clearly than if a pencil were used. Shape the teeth of the saw as shown in Figure 2. It will be noticed that the front edge of a tooth is not at a right angle to the line of teeth like a rip saw but has a hook of 12 degrees less than a right angle. A saw filed with the fronts of the teeth right angles to the line of the teeth would dig into the wood too viciously and work hard. If it were filed to an angle less than shown in Figure 2, it would not "take hold" well and would cut slowly.

To File the Saw

To file the saw, place it in the saw clamp with the teeth projecting above the jaws of the clamp about one quarter of an inch. If it were placed up as for jointing it would vibrate and screech.

A six inch slim taper triangular file is best suited for filing crosscut saws of 7, 8, and 9 points to the inch.

The saw may be filed by pointing the file toward the handle or toward the trip. Some carpenters prefer to file toward the tip, claiming that the saw "takes hold" better and makes a smoother finished cut. The more general practice, however, is to file by pointing the file toward the handle. Hold the file across the blade of the saw at 45 degrees as shown in Figure 3-A. Begin at the handle end. If one side of the file were held horizontal or level the fronts and backs of the teeth would be alike or 45 degrees. The saw would not draw into the wood well. It would cut slowly and require heavy pressure. The file is tilted or tipped slightly toward the tip of the saw so as to give the teeth the proper "hook."

Holding the File

The point of the file is held between the thumb and index finger of the left hand with the palm of the hand toward the worker. The back of one tooth and the front of the one next to it are filed with the same stroke. The full length of the file is used with long, light, and uniform stroke. If the teeth are uneven, pressure is applied on the big tooth, right or left. Thus the teeth are equalized in size. Filing between two teeth is not continued until both have been brought to points. Only enough is done to bring them to a uniform size. Every other tooth is filed

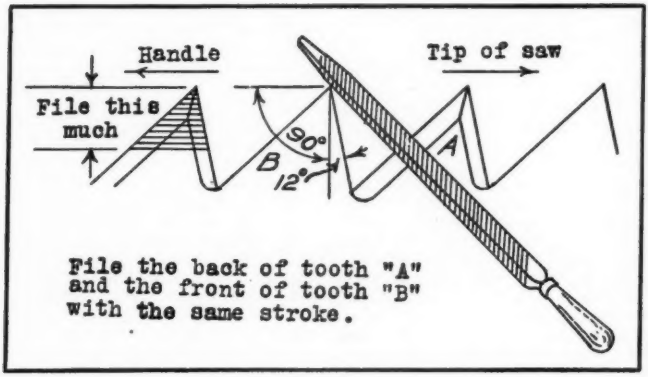


Fig. 2

from one side of the saw and then the saw is turned end for end in the clamp and the others filed from the other side. The worker must be sure and file toward the handle as shown at "B," Figure 3, and tip or tilt the file toward the tip of the saw.

After the saw is filed, it needs to be set so that it will make a saw

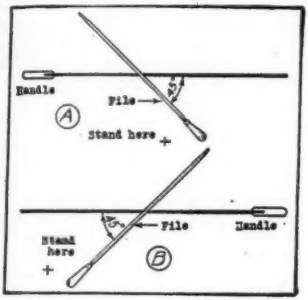


Fig. 3

kerf in the wood wider than the thickness of the blade of the saw. Only half of each tooth is set, as shown in Figure 2. If the whole tooth were set it would be likely to break off. The set at hand is so regulated that it will press or bend over about half of the tooth. The saw is held in the left hand under the left arm, and each tooth set away from the bevel as shown in Figure 2.

Saving 900 Tons of Nuts

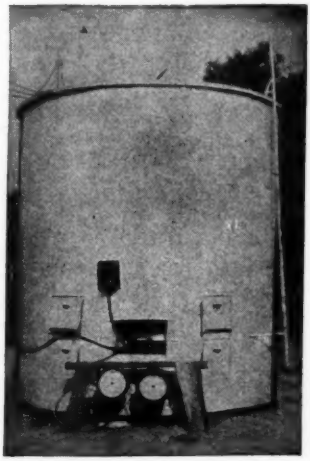
By W. V. Woehlke

ELECTRICITY is giving the walnut growers of California the chance to save 1,800,000 pounds of walnuts a year on an average crop of 30,000 tons. They can do it by drying their nuts with electric heat and controlling both heat and humidity so efficiently that the final product is both heavier and better than walnuts dried by other means.

For many years the walnut growers relied on the well known California sunshine to do the drying for them. That was during the period when every grower was his own boss and did as he pleased —except when he had to explain to his banker that prices once more had been so low that he could not pay his note. When the growers organized the California Walnut Growers' Association, advertised their product and marketed it efficiently, they began to receive more money for their culls than grade A nuts had brought before organization.

Then the association began to preach scientific methods of production and handling. That's when the progressive growers abolished the sun and substituted artificial heat in drying the crop. They could speed up the dehydrating process, control it better and turn out a more uniform product.

Last year power company heating specialists, in cooperation with Professor Nichols of the College of Agriculture, University of California, investigated the walnut-dehydration problem. They found that a long series of tests had demonstrated a moisture content of 8 per cent to be the most desirable, giving the nuts the best flavor, appearance and eating and



The Electrically Equipped Walnut Dryer

keeping qualities. But the growers with the processes then in use were bringing the moisture content down to an average of 5 per cent, thus losing 1,800,000 pounds of weight on a crop of 30,000 tons. On a ten-million dollar value that meant a decrease of $300,000 a year in possible revenue.

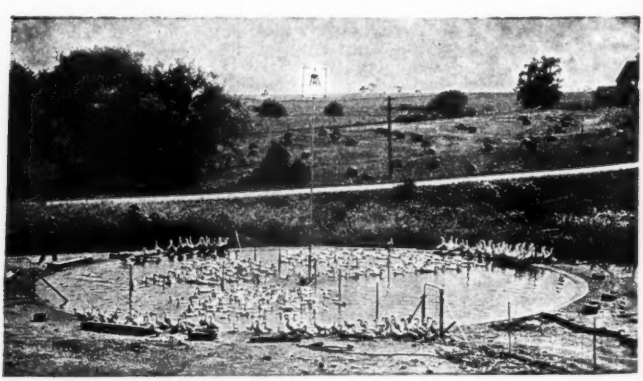
Agricultural College Cooperates With Utility Engineers

The utility company's engineers proceeded to experiment with electric dehydration. With a wet-bulb thermostat they could control the temperature automatically to a range of less than one degree and they could also closely control the moisture. But they did not know how much moisture to leave in the air within the drying apparatus to reach the desired 8 per cent in the product. That knowledge was supplied by the College of Agriculture after a series of painstaking laboratory tests. The results of these tests became available this spring.

This fall many of the progressive growers will go after that extra 3 per cent of moisture and weight by dehydrating their walnuts electrically.

Fire Prevention

All fires start small,—are easily squelched. Farmsteads are generally beyond prompt fire department service and dependent on control of the blaze while still small. A gallon of water applied at this stage is worth hundreds after the fire spreads. With little expense and extra work farms having a large capacity water supply system with pressure tank can get this initial fire protection. A hundred feet of hose with nozzle, hung where it will be handy is the first step. Then the pipe from the pressure tank should be extended to the attic,—to frost-proof hydrants at adjacent buildings and hose connections fitted to the water pipes in the basement and barns. The connecting pipe line should be at least 1 inch for distances up to 200 feet. This system guards only against fires just starting. For more adequate fire protection the following equipment is recommended. A 1,200 gallon per hour pump with a 2 h.p. motor, interconnected with a pressure storage tank of at least 1,000 gallons, 100 feet of 2 inch cotton hose line with a 5/8 inch adjustable nozzle, and 2 inch pipe mains from pump to points of connection.



Making the Ducks Work Overtime

An Indiana farmer placed a canopied electric light over a duck pond. Insects, on trying to reach the reflected light at night land in the water, where the ducks quickly dispose of them. The ducks remain in the pool, actively engaged, as long as the light is on.

ELECTRICAL HOUSEKEEPING

Conducted by
GAIL MEREDITH

Motors Double For the Cook

PERHAPS you haven't counted up lately, but if you want to be impressed some time with the size of the job you are doing, just remind yourself that you get one thousand and ninety-five meals every year. That is, you get one thousand and ninety-five meals unless you are English and want tea every afternoon, or Scandinavian or German and want an extra meal thrown in between breakfast and dinner and another between dinner and supper. If you are, you add a good many more to that imposing total.

In the last few years we have been learning easier ways of cooking than stoking a wood fire, and we have been learning easier and more effective ways of keeping our foods wholesome and sweet than by carrying them down cellar to put them on the dirt floor.

Now along comes a new device that gives us another pair of hands and an untiring arm. It is the electric mixer.

There are some fifteen kinds on the market at present. They vary in size, in price and in performance. The smaller, cheaper ones are hardly more than motors that run fast or slow on egg beaters. They will whip cream and eggs and salad dressing, perhaps a very light batter.

Sturdy beaters costing between twenty and thirty dollars will do all these, and mash vegetables, cream butter and sugar, and beat frostings and candy as well. They will even mix up the batter for a butter cake. They find cutting shortening into flour but a moment's job.

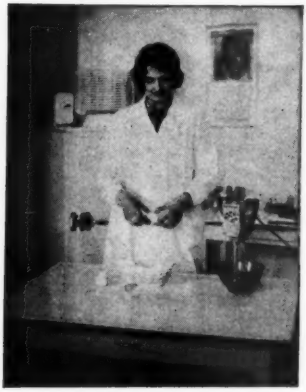
Every mixer has its own special claim to distinction, to be sure. Some are portable. You can take them over to the stove to beat a seven-minute frosting as well as

This beater is fixed to a light standard and has its own bowl for mixing.

This is one of the largest food preparation machines. Its cabinet keeps the various attachments in easy reach.

use them on your work table. Some are fixed to solid standards and fit into bowls of their own, that help the mixing by turning round and round.

There are some mixers that have dozens of attachments that



Here is a portable beater so balanced that it will stand alone.

This device squeezes oranges, too. The beater is on the goose neck arm over the double boiler.

will really handle almost everything we have to do in preparing food. They will beat, mix, and knead, of course. They will also chop vegetables, grind meat, grate cheeze, freeze ice cream, and I have heard it said, peel potatoes. I

Here is one of the beaters mashing potatoes for dinner. This beater has two bowls that fit into a revolving disk on its standard.

myself have not seen a peeling device on one of these machines, but then, I have not seen them all.

These beaters are extra help on baking day. We can turn over to them all the time consuming, muscle using jobs we would be glad to get rid of. No labor saving device, not even a husband, can do more to cut down the actual effort of food preparation. Using them, we become, as our men have become, directors of power rather than sources of power.

Getting Dinner in Advance

MOST of us reap the joy of living from the little pleasures that each day brings, One of them is having our friends about us. But in these latter years when sisters and daughters and servants have left our homes for stores and factories and schools, when all the exacting labor of keeping the house and preparing the food has rested on one pair of shoulders, having company has sometimes seemed that extra straw that just could not be borne.

Machinery to do our work does make a difference. Happily for us, machinery is becoming more common than maiden aunts ever were, and quite as versatile. But even with machines, getting dinner for company involves a lot of work. There is just a certain amount of food that must be ready—all at the same time.

Modern refrigeration cuts down the hurry and bustle that precedes a company dinner at any time of year. Much of the work can be put out of the way hours before the company comes; some of it even the day before. And in the summer time we can practically get the dinner in advance.

Many of us like to have folks in on Sunday when we have long hours of leisure to enjoy our friends. We can do it and still not miss the morning service if we plan it right.

I had twelve for dinner last Sunday and we were not even late for church. That is not because I am always such a good planner, but rather because I had recently happened on a new book of recipes for dishes to be made in my mechanical refrigerator, and it suggested a dozen ways I could get Sunday's dinner on Saturday morning. So I promptly put some of them into practice.

The weather was unseasonably warm so I decided we did not need a hot dinner. Quite early on Saturday I cooked up three fowls and made a big loaf of jellied chicken. I boiled potatoes and eggs for salad. I made salad dressing. I mixed up a batch of refrigerator rolls and I made three cakes. I even made a sugar syrup to put in the iced tea, and squeezed some lemons to flavor it with.

Sunday morning, while it was still cool, I made two trays of pineapple sherbet and put them into my refrigerator to freeze. I made iced tea. I mixed up the salad, and I even turned the jellied chicken on a big platter and put little radish roses all around the edge.

After breakfast I set the table and made up my rolls so they would be ready for the oven when we got home. I got out the fresh strawberry jam and a plate of peach pickles. I even cut the cake

We can look forward to company with pleasure when the dinner is all prepared behind refrigerator doors.

and covered it carefully so it wouldn't dry out.

The minute I got into the house after church, I turned on my electric oven, and the rolls were baked by the time everything else was on the table.

It was a simple meal, but it looked attractive and it tasted good. And what is quite nice from the housewife's point of view, I could enjoy both it and my guests.

Earning Through Saving

ABOUT eleven years ago the Borsodis moved from a New York apartment into the country. Mr. Borsodi had no intention of giving up his professional work to make of himself an amateur farmer. They were looking for a place to live, a place to bring up their boys, a place where they might make their home the actual social, economic and cultured center of their lives. They call the home they have built a homestead because it does have enough ground about it so the boys can make tennis courts, and a swimming pool, and so that they can have a garden big enough to supply a good deal of their food.

The Borsodis sought to substitute domestic production for many of the factory products that had hitherto supplied their needs. Mrs. Borsodi gave up her profession, the writing of advertising, and turned her trained clever mind to the job of earning a living within her home. Her theory, a theory she has proved by experience to be thoroughly sound, was that a woman can save enough money by intelligent operation of her home to make the family income do much more than it is doing now.

We who have been running our homes ourselves for years have always called it saving money. Mrs. Borsodi calls it earning money. The net result is the same. The money the family has buys more than it did before.

Mrs. Borsodi says: "In our home I have found it amazingly profitable to devote my time to this. After figuring the cost of raw materials (purchased carefully) my own time or that of help, interest and depreciation of machinery, and overhead expenses,

What Mrs. Borsodi's Record Book Shows

	Domestic Production	Factory Production
Weekly laundry for 5 adults, including an average of 15 shirts at prevailing laundry prices..		$8.00
Added depreciation on clothes based on eight years' testing showing that home washed clothes had approximately doubled the life of those washed by laundries. Shirts that used to last only 6 months when sent to the laundry now lasted a year when washed at home. The added depreciation on shirts alone when valued at $2.50 is approximately 73 cents per weekly washing. With bedding, table linen, underwear, pajamas, etc., it is approximately..		1.50
Eight hours' labor of laundress at 50 cents per hour (4 hours at each machine).....	$4.00	
Electric current for two machines, washer and ironer	.56	
Hot water (kerosene) in winter-furnace.....	.07	
Soap (home-made)	.02	
Depreciation of machinery at 10 per cent per year	.50	
Interest on investment and overhead (6% on $250)	.10	
Earned for supervision of this work per week, thus paying for the machinery in a little over a year, without making any allowance to cover greater fading, tearing, etc., in the steam laundry	4.25	
	$9.50	$9.50

I found that on many of the things consumed in our home, fabrics and clothes, for instance, I have been able to earn better than a dollar for every dollar that my husband contributed to buying the raw material, equipment, etc."

But Mrs. Borsodi's return to something of the self-sufficiency of the pioneer home is not done with pioneering methods. She takes with her to the old jobs the best of modern equipment. And she has proved to the satisfaction of any one with an eye for figures that she can make that equipment pay for itself in the savings it effects.

Her record book contains an interesting study of the savings she made by doing all of the laundry for five adults at home with an electric washing machine and an electric ironer instead of sending it to the laundry as shown on page 26.

If Mrs. Borsodi had done the work herself, her earning through doing the laundry work would have been $8.25 a week instead of $4.25. As it is she earned the price of the equipment in about sixty weeks. Without spending part of the saving for labor, she would have earned it in about thirty weeks.

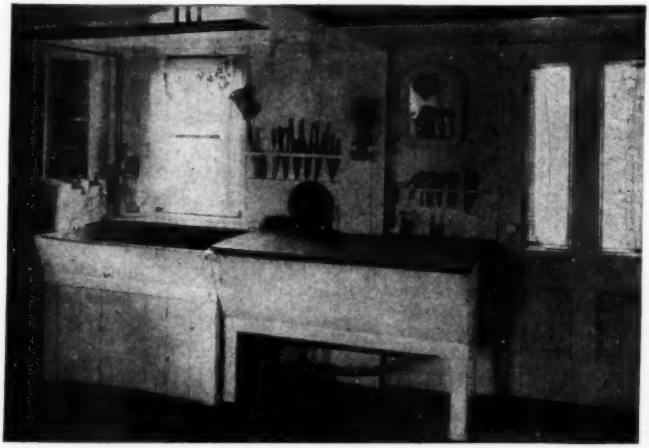
We are accustomed to thinking of the washing machine as saving hours of heavy labor every week, of the ironer as supplanting woman power with its motors, but we are much indebted to Mrs. Borsodi for keeping books on the job and showing us in black and white just what money savings these machines are making, too.

Well-Lighted Layout of Sink and Laundry Tubs

By Katherine Goeppinger

WHILE the ideal arrangement for home laundry work is to have a separate room for the laundry equipment, this is often impossible. In many farm homes, space for tubs, washing machine, ironing board and laundry supplies must be provided in the kitchen. When this is necessary it is advisable to group the laundry equipment in such a way that food preparation and laundry work will not interfere with each other.

The picture shows a farm kitchen in Massachusetts where the tubs have been set next to the sink, for



Well lighted arrangement of sink and laundry tubs.

convenience in placing water and drainpipes, and also because of the good light from the window and the door opening on the back entry. The tubs are provided with a cover which can be used as a worktable. Such a cover may be hinged, but if there are projecting articles on the wall behind it such as the coffee mill and kitchen utensils shown in the illustration, it is probably better to lift it off entirely when the tubs are required. A piece of linoleum has been fitted to the cover in this kitchen, for easier care and imperviousness to water and grease.

It would have been better, if possible, to put the faucets for the tubs inside instead of above them, not only to get them out of the way, but to prevent any annoyance from dripping. The Bureau of Home Economics of the United States Department of Agriculture has made a study of both kitchen and laundry equipment and is interested in placing both to eliminate unnecessary labor and shorten the time spent in these work rooms by the homemaker.

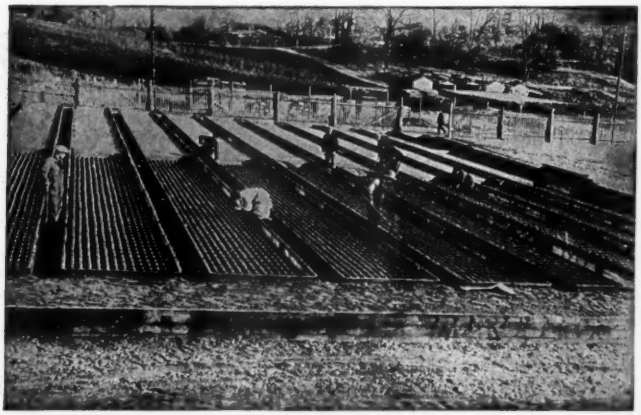
RADIO CALMS THE COWS

By Geo. W. Kable

"Singin' to the cows" is a new job for electricity, which may sound rather strange to a man, but apparently sounds pretty good to a cow. During the past summer, the Detroit Creamery Farm has had six barns equipped with electric radios. It was an experiment, but when we visited the farm the manager seemed to be quite well pleased with the results.

Apparently there are two ways to calm the cows. The cows themselves seem to like the music and contentedly chew their cuds to the accompaniment of the radio with as much satisfaction as we listen to a good program during the dinner hour. The other factor is, that if the barn man should be tempted to give some old Bossy a kick in the ribs, the soothing strains of "Sweet and Low" may cause him to reconsider.

So far as we know, the Detroit Creamery Farm does not have any records of increased milk production attributable to the radio.



In Stockholm, Sweden, electrical heating of beds is done on a large scale. Here you see the laying of tile enclosed electric wires which heat the earth. Bulbs are planted early in the year and when Spring arrives the flowers are in bloom.

Where Dependability
means money saved

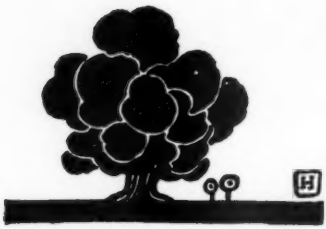
At the Tree Hill Farm, Richmond, Va., this General Electric Milk Cooler is cutting costs . . . helping its owners get highest milk prices.

Join us in the General Electric Program, broadcast every Saturday evening, on a nation-wide N. B. C. network

ON FARMS miles from service facilities, General Electric Refrigerators serve constantly—as dependable as electricity itself—protected by a written 3-Year Guarantee againt service expense. • The simple, current-saving mechanism is hermetically sealed within the steel walls of the famous Monitor Top . . . never needs attention . . . not even oiling. • More than a million satisfied users can tell you about the savings a General Electric will bring to your kitchen. Spoilage is eliminated . . . left-overs can be used . . . time and effort are saved . . . food is kept fresher . . . tastier . . . in the constant coolness of the General Electric all-steel cabinet. • There is a General Electric Refrigerator—with added refinements—that exactly fits your needs. New low prices—generous terms—make it easier for you to own a General Electric than ever before. Write for details. • General Electric Company, Electric Refrigeration Department, Section CZ6, Hanna Building, 1400 Euclid Avenue, Cleveland, Ohio.

GENERAL ELECTRIC
ALL-STEEL REFRIGERATOR

Domestic, Apartment House and Commercial Refrigerators, Electric Water Coolers and Milk Coolers



Under The CHESTNUT TREE

A Guessing Match

Policeman (to motorist who nearly collided): "You should always give half of the road to a woman driver."

Motorist: "I always do when I find out which half of the road she wants."

Boss: "A man is never older than he feels. Now this morning I feel as fresh as a two-year-old!"

Steno (sweetly): "Horse or egg?"

Customer: "You said this blanket is all wool, and it is plainly marked 'cotton'."

Clerk: "Well, you see, we marked it that way to fool the moths."

Imposter

A proud young father wired the news of his happiness to his brother in these words:

"A handsome boy has come to my house and claims to be your nephew. We are doing our best to give him a proper welcome."

The brother failed to see the point and wired back: "I have no nephew; the young man is an imposter."

The teacher was testing the knowledge of the kindergarten class. Slapping a half-dollar on the desk, she said sharply:

"What is that?"

Instantly a voice from the back row: "Tails."

The Hag He Chased

A backwood mountaineer one day found a mirror which a tourist had lost. "Well, if it ain't my old dad," he said, looking at it. "I never knowed he had his pitcher took."

He was so pleased he took the mirror home, stole into the attic and hid it. But his actions did not escape his suspicious wife. That night, after he was asleep, she slipped to the attic and found it. "Hm-m-m," she said, looking into the mirror, "so that is the old hag he's been chasin'."

Modern Camping

Willis: "Hello, where have you been?"

Gillis: "Just got back from a camping trip."

Willis: "Roughing it, eh?"

Gillis: "I'll say so! Why, one day our portable dynamo went off and we had no hot water, electric lights, ice, heat, or radio for almost two hours!"

Son: "Pop, I got a lickin' in school today and it's your fault."

Pop: "How's that, son?"

Son: "Remember when I asked you how much a million dollars was?"

Pop: "Yes, I remember."

Son: "Well, 'helluva a lot' isn't the right answer."

Lady: "You say your father was injured in an explosion. How did it happen?"

Child: "Well, Mother said it was too much yeast, but Father said it was too much sugar."

A Married Man Probably

A man in a hurry rushed into a bank. Two receiving tellers were busy at their respective windows. Two lines had formed. One line contained three women, the other eighteen men. Mr. Man-in-a-Hurry paused and surveyed both lines. He gave a full minute to his survey. Then he joined the line of men.

"Was your uncle's life insured?"

"No, he was a total loss."

Kind Old Squire: "Bless my soul, Mirandy, where did you get that awful bruise on your cheek?"

Mirandy: "We-all had a pahty las' ev'nin', and Ah was kicked in the face by a gentleman friend."

The old lady was very ill. She sent for her niece and said: "Sarah, I am going to die, and I don't want anyone to be fooling about it. When you come to lay me out, I want to be laid out in my black silk dress, but take out the back panel and make yourself a dress from it."

Sarah said: "Oh, Aunt Mary, I don't want to do that. When you and Uncle John walk up the golden stairs, I don't want people to see you without any back in your dress."

"They won't look at me," the old lady replied. "I buried your Uncle John without his pants!"

Your herd is
NO BETTER
than your
COOLING EQUIPMENT

MILK from the finest herd will not bring the high prices unless it is cooled *thoroughly*—and *quickly*. The difference between Grade "A" and Grade "C" is often just a difference of minutes.

The easiest, safest, and most economical way to cool your milk is with Kelvinator electric refrigeration equipment. This equipment is fully automatic, and it does not require any attention. It is economical—low in first cost, low in operating cost, and low in maintenance cost. It is absolutely dependable. And it will last for years.

The Kelvinator Refrigeration Engineer in your nearest town will show you how Kelvinator equipment, installed in your present cases or in new cases of the latest design, actually pays for itself. See him, or, send the coupon below for complete information.

KELVINATOR CORPORATION
14280 Plymouth Road, Detroit, Michigan

Kelvinator of Canada, Ltd., London, Ontario
Kelvinator Limited, London, England

(291)

Kelvinator

C O U P O N

KELVINATOR CORPORATION, 14280 Plymouth Road, Detroit, Mich.

Gentlemen: Please send information regarding Kelvinator Milk Cooling Equipment. Also the name of the nearest Kelvinator Refrigeration Engineer.

Name_____

Street Address_____

City_____ State_____

The Green Knight

PAUL WATER SYSTEM *New Low Price!*

$75

THE Paul Green Knight Water System provides the wonderful convenience of an *unfailing water supply, instantly available,* for the kitchen, laundry or bath! Mighty satisfying too—to have plentiful water, with adequate hose pressure, for sprinkling the lawn, fire fighting or washing the car.

THOUGH miles removed from city water facilities, you may, by the installation of a Paul Water Supply System, *enjoy the same modern bath, laundry and kitchen convenience as your city neighbor.* Best of all, you can enjoy this Water System while you pay for it. Only a small amount down and 12 small monthly payments buys it. *Write today for more details.*

Sold on Easy Payments

FORT WAYNE ENGINEERING & MFG. COMPANY
Fort Wayne, Ind.

Pumps and Water Systems — *Water Softener Heaters*

Ft. Wayne Engineering & Mfg. Co.,
1722 N. Harrison, Ft. Wayne, Ind.

Send complete information and prices on Paul Green Knight Water System . . . and Easy Payment Plan.

Name.....

Address.....

Elevators Speed Up Cribbing and Binning

The farmer who produces corn and small grains under modern methods is oft-times hampered in his work because of inadequate, or in many cases, lack of cribbing and binning machinery. Scooping corn into low cribs or wheat into a driveway bin was all right when acreages were small and elevators were not available, but this practice now is both expensive and difficult. Use of the combine-harvester and corn picker-husker have cut harvesting costs and speeded up harvest so much that storing grain by hand is often a limiting factor if labor is scarce, or if labor is available, an expensive operation.

Two principal types of steel elevators are now made. One is the portable type, the other an inside cup elevator. Portable styles have been improved until they are lightweight, but exceptionally strong; easily moved; efficient; and convenient for motor operation. The portable elevator may be moved on its own wheels, and will elevate corn, wheat, oats, or other small grain. Farmers find that with the aid of this machine one man can easily unload grain from a combine or corn picker-husker.

Inside cup elevators are usually installed in combination corn cribs and granaries. It has been found that the cost of building such a storage crib and equipping it with an elevator is actually less than putting up an old-fashioned crib having the same capacity. This is because the waste space over the driveway is utilized for bin space.

In a crib of this kind the dump is installed in the driveway. Either a pit dump or hoist dump may be used. The steel elevator shaft runs upward on one side, and at the top a swinging delivery spout sends the grain or ear corn into any bin. The inside cup elevator is operated with belt power and may be installed in as old or new barn. The complete outfit is simple, and will last a lifetime. Use of this device makes possible handling of large quantities of grain with as much ease as in a large storage elevator.

Three Aims in Meat Cookery Suggested by Specialists

IN preparing several popular leaflets on meat cookery the food specialists in the Bureau of Home Economics of the United States Department of Agriculture have emphasized three definite aims. These aims have grown out of long experience in cooking meats in the laboratory in connection with a nation-wide study of the factors that influence palatability.

The first point developed is that meat must be cooked according to the cut. It is well known that the cuts of meat from different parts of a carcass vary somewhat in tenderness. Tender cuts can be cooked quickly unless they are large roasts, and are best cooked in utensils without lids and without water. Less tender cuts should be cooked slowly with a judicious amount of water to soften the connective tissue.

Improve Flavor of Meat

How to cook meat to bring out the maximum of flavor is the next point emphasized. The home economics specialists advocate browning meat on the outside to develop rich flavor. After that is done, cooking is continued in the appropriate way for the probable tenderness of the cut. The flavor of the meat may also be enhanced by savory stuffings and gravies.

The third point emphasized in giving directions for cooking meat in the household is to eliminate guesswork as to when the meat is done. The oven thermometer and the roast-meat thermometer are recommended as a means to this end. "So many minutes to the pound" is not a sure guide. The roast meat thermometer, put directly into the meat before the cooking is begun, shows when the desired stage has been reached. Moreover, it shows when to stop cooking. Every additional minute's cooking beyond the required "rare," "medium," or "well-done," stage simply wastes the meat by shrinking it unduly.

"They Keep a-Running"

5 Horse Power Century Portable Power Unit

Hard Jobs Made Easy

This Century Portable Power Unit will make many hard farm jobs easier because it can be used almost anywhere to furnish motor power to many types of farm machinery. It can be easily moved from place to place—when in the operating position it stands rigidly in place—belt tension can be properly and quickly adjusted . . . Three sizes of pulleys are furnished to give the correct speeds for the majority of farm equipment . . . Furnished for either single or 3 phase power in standard 3, 5 and 7½ horse power sizes.

CENTURY ELECTRIC CO.
1806 Pine St. St. Louis, Mo.

40 U. S. and Canadian stock points and more than 75 outside thereof

Century MOTORS

Ground Wheat for Livestock

ADVISABILITY of feeding wheat to livestock is a question which often confronts livestock feeders when the prices of corn and wheat are close together. E. T. Robbins, extension specialist at the Illinois Experiment Station, reports that coarsely ground wheat is worth as much or more as the same weight of shelled corn for hogs. When wheat is 75 cents a bushel and can be ground for 5 cents or less, it will pay to feed wheat instead of 75-cent corn. Cheaper corn, however, would likely be a more economical feed. Ground wheat, according to Mr. Robbins, has about the same value for other stock as for hogs.

Information from the Ohio Experiment Station advises that tankage or some other similar high protein supplement, should be fed to hogs, with wheat, for best results. At this station, rations consisting of wheat and tankage have given better results than equal amounts of wheat and corn plus the usual allowance of tankage. J. W. Wuichet, the extension specialist, states that wheat should always be ground or cracked. Soaking is not as good nor as economical as grinding.

Wheat in the dairy ration will give an equal bargain with corn and oats, when wheat sells at 90 cents and a fifty-fifty mixture of the latter at $1.46 per hundred pounds. When wheat is 70 or 80 cents, the respective corresponding values of the mixture are $1.14 and $1.30 per hundred. For dairy cattle, ground wheat if fed alone, will usually be sticky and difficult to masticate, but when mixed with corn and oats this difficulty is not noticeable.

Ordinarily farm feed mills may be used to crack or grind wheat. For hogs, specialists point out that only cracking the kernels is preferable. For the dairy ration mixture grinding is usually desirable, although fine grinding is not necessary.

SUBSTANTIAL
PRICE REDUCTIONS
on F-M HOME WATER SYSTEMS!

FAIRBANKS-MORSE, for over 70 years America's leading builder of pumping equipment for homes and cities, have made sweeping price reductions on fully enclosed, electric Home Water Systems. These quality-built plants—formerly selling for $75 and $107.50—are now priced at only $66.00 for the 210 gallon per hour size and $94.50 for the 420 gallon per hour size! These low prices (f. o. b. factory) include 60 cycle motor, pump, tank, automatic switch. All concealed in compact, blue-lacquered enclosure. Easy terms. Operating cost only a few cents a day! Write for details and valuable FREE BOOK!
Address: 900 S. Wabash Ave., Chicago.

FAIRBANKS-MORSE
Home Water Systems

Was $75 . . . NOW ONLY
$66
(Cash f. o. b. factory)

Education Pays Farm Dividends

FARM boys who elect vocational agriculture in their high school course or receive instruction at their state agricultural college may expect to receive profitable dividends as a result of this special training. This is indicated by a recent survey in Livingston county, New York, by the state college of agriculture. Of a group of 17 farmers who on the average had spent a year at the agricultural college, 35 per cent made labor incomes of $2,000 or more. This group, which included a number who had enrolled only in the short courses at the state college, received an average income of $1,262 as compared to an average of $834 for the high school group.

While 18 per cent of the farmers in the high school group made a labor income of $2,000 or more, only 5 per cent of the men who had not been beyond the public school reached this standard. That technical information is important was indicated by the low earnings of farmers who had received their education in schools which did not offer agricultural training.

Proof that education has become increasingly important during the past twenty years is evident in comparing the average incomes of the groups in this survey with those of the two previous surveys. Twenty years ago the average labor income of the high school group was but 10 per cent greater than those who had received only a common school education. Ten years ago this advantage increased to 51 per cent, while the last survey showed an increase to 58 per cent in earnings for this group.

The use of modern equipment, whereby the farmer becomes a director of greater power than he formerly controlled, places an increased responsibility on management which may be developed by education and special training.

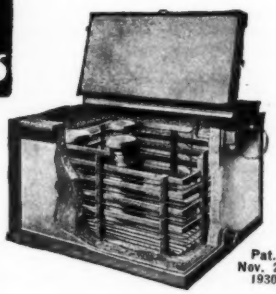
3 EASY STEPS to DAIRY PROFITS

Hot water washing, dry-air sterilizing, correct cooling of milk—these three things bring the larger profits of dairying within easy reach. Bacteria cleared away and kept from multiplying—milk stays sweet and in greater demand—rejections curtailed.

Esco does these three important jobs **electrically.** The Esco Water Heater supplies sizzling hot water in the milk house at low cost; the Esco Dry-Air Sterilizer holds your cans and pails sealed in a bacteria-proof cabinet; and the Esco Milk Cooler keeps your milk below the bacterial point of 50° at less cost than ice.

Ask your Power Company, electric refrigeration dealer, hardware and implement dealer, or write to us.

ESCO CABINET COMPANY
WEST CHESTER, PENNA.



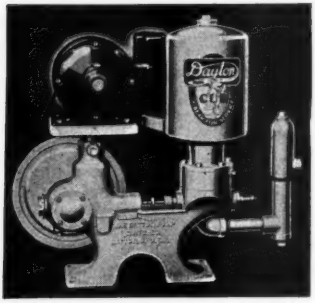
Pat. Nov. 25, 1930

ESCO—the original electric Milk Cooler—rapidly revolutionizing the cooling and storing of milk on the dairy farm. All important engineering features which supply correct cooling without waste, covered by patents.

Merely plunge cans of milk into cold water in cabinet and leave until delivered. Cools quickly to below 50° and keeps milk cold at very low cost.

ESCO
"The STANDARD of the BETTER DAIRIES"

Running WATER AT LOW COST—



250 GALLONS Per Hour WITH the DAYTON CUB!

Here's the economical water supply for you! The DAYTON Cub Shallow Well System, recognized as the finest low-priced water system on the market and now better than ever—with greater capacity—and still only $65.00 (f.o.b. Dayton). The Cub is a complete electrically operated automatic water system for year-round service in the home. It delivers 250 gallons per hour from any depth of 22 feet or less. In many homes the Cub serves as the entire water supply—in others it is used for cisterns and other special or auxiliary uses.

Send the coupon for a full description of the Cub and other DAYTON Models. The Dayton Pump & Mfg. Company, Dayton, Ohio, U. S. A.

Dayton WATER Systems

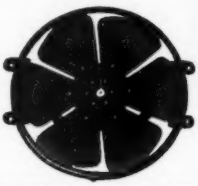
The Dayton Pump & Mfg. Co. EF-6
Dayton, Ohio.

Gentlemen: Please send me your folder showing the complete DAYTON line.

Name .....

Address .....

MAKE THE *WATER* DO THE RUNNING



VENTILATION *Means Larger Profits*

The importance of correct ventilation cannot be ignored.

Equipped with dust-proof motor, and propeller designed to give maximum delivery of air, MARATHON "OK" Fans are specially adapted for the dairy barn, chicken coop and barn ventilating system.

16"—1160 RPM or 1740 RPM — $55
18"—1160 RPM or 1740 RPM — $65
20"—1160 RPM only — — — $75

MARATHON
ELECTRIC MFG. CO.
WAUSAU, WIS.

PUMP WATER *By* Electricity

The new Stover Electric Pump Jack fills a long-felt need. It is a small, compact, powerful, motor-driven unit. Direct-connected, gear-driven motor, 1/4 or 1/3 H.P.

STOVER PUMP JACK

This new unit is convenient, quiet, fool-proof. Write today for our latest catalog on Pump Jacks and other electric driven machines.

Stover Mfg. & Engine Co.
Electric Driven Farm Machinery
171 Lake St., Freeport, Ill.
Established 1862

Also makers of Windmills, Feed Mills, Engines, Corn Shellers, Saw Frames, etc.

WINNERS of April Contest
First Prize—$25.00

"THE ONE SHE'S BEEN LAYING FOR."

Jack L. Baker,
R. 2, Cooper, Texas.

The following titles have been selected as winners of the $5 cash prizes:

"Why should the bunny get all the attention, When the 'Little Red Hen' is so worthy of mention?" Mrs. A. H. Burkhart, R. 1, Oswego, Ill.

"How did the egg get painted so, Old Mrs. Hen would like to know?" Lila Davies, R. 1, Mazon, Ill.

"An Easter rabbit with chickens four, Puzzles 'Biddy' more and more." Mrs. V. E. Dart, R. 4, Caldwell, Idaho.

"Bunny gets credit don't you see, For all the work that's done by me." Mrs. G. C. Mertz, Warren, Mich.

"The fancy egg and the Easter bunny, To the hen and her chicks are terribly funny." Mrs. Roy Phillips, R. 31, Bergen, N. Y.

RULES for June Front Cover Title Contest

For the best title to this month's front cover illustration, a cash prize of $25.00 will be awarded.

In addition, we will pay $5.00 for each of five titles given honorable mention.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

The winners will be announced in the August issue.

Only the farmers or members of the farm family, to whom this magazine was sent, are eligible.

Only one title may be submitted.

Use the form below or write your answers on a plain sheet of paper in similar form.

Contestants must answer question (a).

Write plainly and send your suggestions to the Title Editor, ELECTRICITY ON THE FARM, 24 W. 40th St., New York, before July 1.

My title for the June Front Cover picture of ELECTRICITY ON THE FARM is.....

.....

.....

.....

.....

.....

(a) Approximately what percentage of the income from your farm is obtained through the sale of:

(1) Dairy Products ..... %
(2) Poultry Products ..... %
(3) Garden Truck ..... %
(4) Field Crops ..... %
(5) Beef, Cattle and Hogs..... %

Name ..... R. F. D.....

Post Office..... County..... State.....

Questions and Answers

Conducted by
H. J. GALLAGHER
Agricultural Engineering Dept.
Michigan State College

Note—Readers are invited to send in questions which will be answered in the order received.

Question: *Please advise me whether it is economical to use an electric milk cooler when plenty of water is available or is it better to cool milk with ordinary cooler. Also, is a refrigerator on the market that would hold six cases of milk (evening milk) or would it be cheaper to bottle it in the morning and get a refrigerator to hold the milk in cans over night?*

Paul H. Wentz,
Quakertown, Pa.

Answer: Without more definite information as to the amount of milk produced on your farm, the way in which your milk is sold and the price received, it is rather hard to analyze your problem. Evidently the milk is retailed in bottles which necessitates better refrigeration than ordinarily obtained by cold water. In my estimation a combination of water cooler and electric refrigeration would answer the purpose to best advantage; the animal heat to be removed from the milk by a surface water cooler as soon as the milk is produced, the milk to be immediately bottled and put in cases and the cases placed in a dry storage or walk-in type electric refrigerator.

There are wet storage refrigerators on the market varying in size from four-can capacity up. The wet storage type have the cooling coils installed in an insulated tank of water. Storing the night's milk in cans and bottling in the morning is not a recommended practice as the milk must be thoroughly mixed before bottling.

It should always be remembered that any kind of mechanical refrigeration is only one factor in producing clean milk. The function of refrigeration is to retard bacteria growth; it does not reduce the number of bacteria in the milk. Thorough sterilization by steam or chemical wash on the milking utensils and surface cooler insures clean milk entering the refrigerator. The refrigerator will then do its part satisfactorily.

Question: *How much would it cost me per month to run a pressure pump? I have to put a new well down. The wells in this section are from 40 to 150 feet deep. I have 16 cows, 8 head of young cattle and 6 horses. We use an electric stove. We use from two to three hundred K.W.H.'s every month.*

C. E. Bowen,
Smyrna, Michigan.

Answer: With a running water system in the home each member of the family will use approximately 35 gallons of water per day. A horse consumes 10 gallons. Milch cows—10-30 gallons, young cattle—5-10 gallons. Approximately 600 gallons of water will be used each day. An average of one kilowatt hour per day will pump this amount of water. A large bulk of the current you use in on the lowest step of your rate. Any additional uses as the contemplated water system will be negligible in operating costs.

If the vertical suction from the water in the well to the pump is not over 20 feet, use a shallow well pump; if the vertical suction lift exceeds 20 feet, use a deep well pump. Either type pump should have a capacity of at least

400 gallons per hour. A 30-40 gallon pressure tank should be large enough. Have the pump equipped with a cold water drinking tap so that the drinking water is pumped direct from the well without passing through the pressure tank.

Question: *In operating a 220 volt, ½ horsepower repulsion induction motor on an automatic water system, should the wire leading from the fuse box be any definite gauge?*

C. C. Berner,
Drums, Pa.

Answer: No. 14 should be the smallest wire used to a distance of 300 ft., No. 12 to 400 ft., No. 10 to 600 ft., etc., the conductor increasing in size as the carrying distance increases.

Reducing Weevil Damage

Something new in the program for reducing weevil damage in the pecan grove is the providing of nest boxes for birds, the United States Department of Agriculture says.

W. L. McAtee, of the Bureau of Biological Survey, points out that it is possible to induce weevil-eating birds to inhabit the pecan grove. The only "sales talk" necessary to interest the tufted titmouse, the crested flycatcher, the purple martin, and the bluebird in moving to the new community, is to provide them attractive homes, rent-

MORE PROFITS
from Chicks

For breeders, poultry-raisers, hatcherymen—extra quality, extra profits in Petersime Electric Hatched Chicks. Petersime Incubators give unmatched results — lowest operation costs—built in five sizes from 1,400 to 15,984 capacities.
Write for NEW FREE Catalog. No obligation.
Ira M. Petersime & Son
EF-34, Gettysburg, Ohio

Built for Hard FARM SERVICE

Master Guaranteed Motors are exceptionally well designed to give that dependable, trouble-free service so necessary on farm jobs. They require very little attention. Made in sizes 1/30 to 10 H.P. —a motor for every kind of farm job. Cost no more than other makes.

The Master Portable Motor (on wheels) is a handy power unit that saves time and labor on such jobs as sawing wood, filling silos, grinding feed, etc. Write for more complete information.

Master Portable Farm Motor

THE MASTER ELECTRIC COMPANY
Dayton, Ohio

MASTER
Guaranteed
MOTORS
1/30 *to* 10 H. P.
More Than 100 Service Stations

TAYLOR BROS. ELECTRIC CHURNS

You didn't know you could get an Electric Barrel Churn? Well, you can and a good one. Sizes 10-15-20-25-35 and 50 Gal. Extra strong, well built frame with metal bearings.

The simplest, most convenient and efficient Rotary Churn ever made. No belts, pulleys or gears. Mounted on casters—drain faucet and everything. Sizes 1-2-3-6-8 and 10 Gal.

Sold by Power Companies or write

TAYLOR BROS. CHURN & MFG. CO.

St. Louis, Mo.

BUY DURO NOW

And settle the water supply problem forever—only a few dollars down payment brings fresh running water under strong pressure, piped into your house. Makes possible water in the kitchen, bath, inside sanitary toilet, laundry, water for sprinkling, lawn and garden, live stock and chickens. Write for illustrated electric water system catalog.

THE DURO COMPANY
537 E. Monument Ave., Dayton, Ohio

DURO
Automatic Water Systems

You can rely on our advertisers. If they can't supply your wants see Inside Back Cover.

I D E A L
LABOR SAVING HAY HOIST

Takes the place of man and team operating hay carrier, stacker, etc. Furnished either Single Drum, or, with Pull-Back Drum for returning empty carrier. Operated with any motor or engine from 2 H.P. up.

UNIVERSAL HOIST & MFG. CO.
200 East 14th Street Cedar Falls, Iowa

Write for complete details —today.

Fully guaranteed— 10 DAYS TRIAL.

free. Community bird baths and drinking fountains are other features that might be added to induce the birds to take up permanent quarters in the grove. Suppression of the natural enemies would also make the grove a more acceptable place in which to live.

The Biological Survey offers free details about nest construction and protection for these birds to anyone requesting them.

Soybeans as Manure

Soybeans grown as a green-manure crop should be plowed under at the blossom stage to insure the maximum soil improvement, the United States Department of Agriculture has found. Soybeams blossom in from 30 to 95 days after planting, depending on the variety, time of planting, and soil and climatic conditions. Most of the nitrogen has been gathered in the plant by blossom time. About the maximum amount of organic matter has been produced and the plant is still tender and juicy enough to decay within 35 or 45 days. If allowed to grow longer, the plant becomes woody and decays slowly. The crop should be covered by about 3 inches of soil, so the plants will have sufficient soil moisture even in droughts to decay. If covered with less soil, decay may be retarded by lack of moisture; if deeper, air will be excluded and decay retarded.

He: "Darling, I've made up my mind to stay at home."
She: "Too late, dearest, I've made up my face to go out."—*Judge.*

Farm Equipment in New Jersey

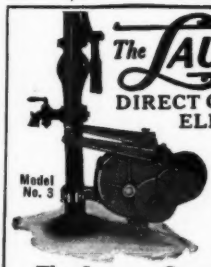
The reason that 30,000 New Jersey farmers, occupying not more than 2 million acres of land are able to produce 19 staple items of human food far in excess of state consumption is due to the widespread use of labor-saving machinery and equipment to secure a maximum amount of produce from a minimum of land, according to William B. Duryee, secretary of agriculture of that state.

In Burlington county, where Benjamin Franklin in 1749 introduced the first plow in New Jersey and Charles Newbold invented in 1797 the first cast iron mold-board plow in the United States, a recent survey reveals the trend in farm and home equipment. Of the 1,283 farms, 934 had trucks for transportation of fruit and vegetables to the metropolitan markets. More than 50 per cent of the farms were tractor equipped including 14 garden tractors which were used for cultivating row crops. Although not a dairy county there were 324 silos and 91 milking machines, a considerable increase over a few years ago.

Approximately 31 per cent of the farms were equipped with electric light and power and 41 per cent had running water.

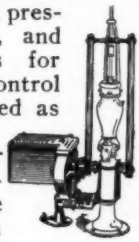
Friend: "Whom does your little son look like?"

Happy Father: "His eyes are mine, the nose is my wife's, and his voice, I think, he got from our auto horn."



The LAUSON
DIRECT GEARED ELECTRIC JACK
Model No. 3
Built like a high grade auto transmission.
Also interchangeable motor or gas engine.
The Lauson Corporation
700 Michigan St., New Holstein, Wis.

Cullman Electric PUMP DRIVE
Can be Equipped with Automatic Control
The Drive is the first unit of a complete Cullman water system. Float switch or pressure switch, air chamber, pressure gauge, and other parts for automatic control can be added as desired.
Start your water system with the Cullman Pump Drive.



Write for booklet
CULLMAN WHEEL CO.
1342 Altgeld St., Chicago, Ill.

The Inside Back Cover is for your convenience Why not use it?

NEW WAY TO CHURN
Thousands are changing to this simple, convenient, modern way to churn. It's the famous DAZEY principle adapted to electrical operation. Ends the drudgery. Just turn the switch. Made in 2, 4, 6 and 10 gallon sizes. Write today for catalog and further information.
DAZEY CHURN AND MFG. CO., Dept. 27
Warne and Carter Avenues, ST. LOUIS, MO.

Blessing of Electricity

The old saying "You never miss the water 'till the well runs dry" comes home to us occasionally when the current is suddenly cut off, in the midst of ironing or an interesting radio program. Or as happens more frequently the lights suddenly go out and we have to hunt up the old kerosene lamps. On occasions as this the whole family feels gloomy and abused, then just as suddenly the current comes on and happiness is again restored. Then more than ever we appreciate the blessing of electricity.

MRS. F. J. OSBORN,
Winnebago, Ill.

* * *

A Worthwhile Convenience

By having a water system installed, it was made possible to have hot and cold water, in kitchen, laundry, bathroom and milk house, all by simply turning a faucet.

This proved to be the greatest time and labor saver of all our electric equipment.

We can safely say that the money we invested in our water system was well spent.

I can now easily do my work without hired help, which is a greater saving than the operation of our electric pump.

Therefore, our electric water system is considered an indispensable electrical servant.

MRS. J. H. GRENZOW,
Juda, Wis.

* * *

Motorized Handy Man

My electric motor is what I consider a handy man of unsurpassed qualities. This little motor is faithful at anything I ask it to do, such as—it pumps the water for thirty-two head of cattle, runs the milking machine, separator, feed grinder, turns the grindstone and saws my wood.

This motor is the cheapest help I have found in my years of experience as a farmer, so, therefore, I naturally consider it a favorite among our electrical servants.

ALBERT FINNEGAN,
Madrid, N. Y.

Fresh and Cold

My electrical refrigerator is an economical servant. The food is always kept fresh and cold. We always have ice, especially during harvest, when the men need ice water, lemonade, etc., and are too busy to go to the ice plant for ice. Before I got the refrigerator I always had to send to the ice plant for ice, but now my ice man is right in my kitchen, and I hope he shall always remain with us.

MRS. HENRY W. ZINKHAM,
Box 65, Phoenix, Md.

* * *

Turn the Switch

In former days before electricity was at hand our chickens hardly laid at all, just a few eggs for ourselves. Now that we have the electric lights we set a light in the chiken coop. Let me tell you it's a great thing to have! We save a lot on feed and trouble. Before we had electric service it was necessary to bring a lantern into the coop, but I was afraid of fire and didn't use one at all. Now it is so easy to do, just turn the switch on and off without trouble. We have 90 chickens in all. We made enough profit with our eggs since Nov. 7, 1931 to pay all our wiring expense and our $7.00 per month for the current. So it's easy to see that electric lights are a great convenience.

MRS. PAUL DANTOIN,
Casco, Wisconsin.

CLASSIFIED ADVERTISING

The LYON ELECTRIC COMPANY manufacture electric poultry equipment exclusively. Long, practical experience in the highly developed California rural electric field enables us to furnish quality devices at reasonable prices. The LYON line includes: Brooders—Incubators — Egg Testers — Burglar, Temperature and Power-off Alarms — Heating Elements—Thermostatic Supplies—Time Switches—Wiring Supplies. Write for catalog today. LYON ELECTRIC COMPANY, 2075 Moore Street, San Diego, California.

MERCHANDISING SUPPLEMENT

Electricity on the Farm

Vol. 4 JUNE, 1931 No. 6

Persistency Pays

In these times of hard earned sales, a whole lot more effort is required to produce results than when everything was in a boom stage. The remarks below reprinted from an exchange (Rural Electrification, London), are inspiring:

Hard work means nothing to a hen. She just keeps on digging worms and laying eggs, regardless of what the business prognosticators say about the outlook for this or any other year.

If the ground is hard, she scratches harder.

If it's dry, she digs deeper.

If it's wet, she digs where it's dry.

If she strikes a rock, she works around it.

If she gets a few more hours of daylight, she gives us a few more eggs.

But always she digs up worms and turns them into hard-shelled profits as well as tender, profitable boilers.

Did you ever see a pessimistic hen? Did you ever hear of one starving to death waiting for worms to dig themselves to the surface?

Did you ever hear one cackle because work was hard?

Not on your life. They save their breath for digging and their cackle for eggs.

Success means digging. Are you?

RURAL ELECTRIFICATION Salesmen's Forum

Conducted by TRUMAN E. HIENTON

Washing and Grading of Fruits and Vegetables

ELECTRIC power and the grading and washing equipment for fruits and vegetables which it operates are becoming invaluable items in the preparation of those crops for market. Consumers are demanding graded products with a resulting higher return to the grower, apples free from arsenical spray residues, and vegetables washed clean enough for cooking.

Field Demands Attention

The tasks of grading and washing usually come at the time of crop harvest, the busiest season of the year when labor is at a premium, so that mechanical power, particularly electric, becomes a necessity where machines of any size are employed. This field, while relatively new and of a rather highly specialized nature in so far as equipment is concerned, is one which demands attention from power companies and dealers alike.

The American public has generally become aware of the value of graded products and is willing to pay for the extra cost which is involved and pay a premium in addition. The Purnell Act was passed by Congress in 1925 primarily to provide funds to investigate the marketing of agricultural products. Results of studies conducted by investigators in agricultural experiment stations, some of whom were financed in part by this bill, show interesting results from the value of grading certain products.

The results of a study made by Prof. F. C. Gaylord of the Purdue University Agricultural Experiment Station are reported in Bulletin 308 "Marketing Indiana Onions." The following paragraph is of particular interest: "A concrete and striking example of the loss from shipping inferior onions was found in the 1923 season, when two growers each had two cars of yellow globe onions of about the same quality. One grower of several years experience harvested and graded his crop with his own standard in mind. His two cars failed to make the U. S. No. 1 grade and were shipped as loaded. The other carefully sorted his onions and shipped a large car that passed the U. S. No. 1 grade. The three cars of onions were sold by the same agency on the same market at approximately the same time. The two cars of onions that failed to make the grade brought the first grower $250.00 while the one large car brought the other grower $1,-100.00."

In another bulletin, No. 309, "Indiana Peaches" likewise prepared by Professor Gaylord, the following statement appears in its summary: "In 1926, Indiana peach shippers packed according to the U. S. grades with a system of government inspection. The production of high quality peaches, followed by rigid grading, packing, and branding, resulted in a uniform product from the section, which commanded from 50 cents to one dollar a bushel above those from competing territory."

The effect of grading on the prices of apples is very well emphasized in Circular No. 91 of the U. S. Dept. of Agriculture by J. W. Park, Associate Marketing Specialist of the Bureau of Agri-

cultural Economics. His conclusions follow: "Auction prices of western boxed apples afford a means of determining the premium in price paid for the better grades. A comparison of the weighted average prices for five varieties—Jonathan, Delicious, Winesap, Rome Beauty, and Yellow Newtown—during the period of the study indicates that in Chicago the Extra Fancy grade averaged about 15 per cent higher in price than the Fancy grade and the C grade averaged 18 per cent lower than the Fancy grade. In New York the Extra Fancy grade averaged approximately 15 per cent more than the Fancy grade and the C grade approximately 20 per cent less than the Fancy. All important varieties in each season showed a similar price differential among the grades though in somewhat varying ratios."

The importance of the value of proper grading of potatoes is set forth in Circular 127 of the Pennsylvania Agricultural Experiment Station by J. B. R. Dickey. A section of his discussion on grading consists of the following: "A well-grown crop deserves to be well-graded as a matter of both pride and profit on the part of the grower. United States No. 1's often outsell ungraded stock by 20 per cent on the central markets. By neglecting grading, or by grading in a half-hearted manner, we have failed to establish a good reputation for Pennsylvania potatoes, and Pennsylvania growers and shippers, in most of our markets. We thus lose much of the discriminating trade to distant states."

Crop Size Determining Factor

The financial value of grading to the producer is well illustrated in the preceding quotations. His first problem in deciding to grade his products is whether the quantity he produces is sufficient to warrant his investing in a grader or whether to attempt to grade by hand. Hand grading because of the time required and unsatisfactory work is usually not to be considered except in cases where very small amounts are to be graded. Hand operated machines are available at low cost which are satisfactory for the small grower, but in many localities mechanical power-driven grading machines are owned and operated co-operatively to which he can transport his products and have his grading

Grading onions in the packing sheds of Louis Ruderman, Laotta, Ind. The grader is electrically operated, power coming from farm electric line.

done more cheaply than with hand driven graders.

There should be no question in the mind of the operator regarding the choice of the power unit if he has electric power available. All well-known fruit, potato, and onion graders may be operated by electric motors excepting certain hand operated models. The necessity for having power to operate the grader at all times is unquestionably the deciding argument in favor of the electric motor (should there be any). An illustration of the importance of reliability of the power unit on the grader came to the writer's attention in the packing house of a fruit farm in the Indiana peach district several years ago. During the middle of the peach harvest, three carloads of peaches were being picked, graded, packed, and shipped per day. On one day during the height of the harvest, the engine driving the grader developed mechanical trouble while in operation and stopped. A delay of over one-half day ensued while the engine was being repaired, with resultant delay in moving the peach crop to the market.

Fruit graders are usually recommended for handling peaches and pears as well as apples. An important feature required of such machines is gentle handling of the fruit to avoid unnecessary bruising. Sizing is usually very accurate and done at less cost and in less time than by hand. Power cost for operating the grader is very low. Motor sizes recommended for graders for all of the articles mentioned previously vary from ⅓- to ¾-horsepower depending upon size and make of machine.

Power Cost Records

Records secured by the author on two motor-driven apple graders of the same size and make in southern Indiana showed, in one case, a consumption of .93 kw.-hr. and, in other, .54 kw.-hr. per 100 bushels graded. This variation is due to the fact that in the first installation a motor of greater size than necessary was used. Figures are not available for grading peaches and pears but power consumption should be very similar. Figures reported from Pennsylvania show that 600 to 700 bushels of potatoes are graded with one kilowatt-hour of electric energy.

Grading and packing apples on the Moses Fell Annex Farm, Bedford, Indiana, using a motor driven grader.

A certain portion of spray materials applied to apples adheres to the fruit and may be harvested with it. The amount of residue depends of course upon the lateness of application and the amount of precipitation which occurs between the time of the last spray and harvest. The most objectionable residue, arsenious oxide is one which has caused fruit growers much concern during the past five years.

A limit of the amount of allowable arsenic or tolerance was established in 1903 but Federal inspectors were not insistent on adherence to this regulation until 1926. The previous year the English government threatened an embargo on American apples on the ground that they were unsafe for eating, and efforts followed to enforce the rules in order to preserve this export market. A tolerance of .01 grain of arsenious oxide per pound of fruit is allowable for export shipments but will not be required for interstate shipments in the United States until 1932. The amount permitted under 1931 regulations for such shipments is .012 grains per pound.

Residue Elimination Desirable

The necessity for the removal of this residue resulted in some investigational work to determine practical methods for its elimination. The first methods employed relied upon rubbing or brushing to remove the residues, but these were not found entirely satisfactory in removing a sufficient percentage of the unwanted material. Another disadvantage of the mechanical cleaners resulted from their causing a large percentage of residues located on the cheek of the apples to be rubbed into the waxy covering rather than removed.

This investigational work which was carried on at the laboratories of the Bureau of Plant Industry at Wenatchee, Washington and by the state agricultural experiment stations of Oregon and Washington also included studies on the washing of apples. The various types of cleaning agents and washing machines received their attention. The results of these tests and those of the New York State Agricultural Experiment Station agree on the use of hydrochloric acid as the most satisfactory cleaning agent when mixed with water. Other points of interest determined in these investigations showed that the cleaning efficiency of the acid solution was increased by heating it to 95° to 98° F.

Washers Tested

Seven types of washers were tested and are listed in the order of their effectiveness with the most satisfactory first; jet spray, fan spray, flotation and spray, flood wash, flotation and dip, box dip, and flotation spray. Conclusions reached in Circular 59 of the U. S. Dept. of Agriculture state that "Any washing method which applies the solvent solution to the fruit by diffused spray, flood wash, flotation, or a combination of these would give satisfactory results for ordinary cleaning requirements."

Apple washers may be made at home or purchased from commercial manufacturers. The first cost of the home-made machines may be less than the others but it is doubtful whether their life will be as great. A machine which can be built by the grower was designed by Oregon Agricultural College. Washers, whether built by the grower or purchased, are usually equipped with electric motors. The sizes of motors required vary from 2 to 10 horsepower for commercial washers while a ½-horsepower motor is recommended for the Oregon home-made washer.

An indication of the increase in the use of these machines is shown in the State of New Jersey where the number adopting cleaning methods rose from one in 1926 to 27 in 1930. A total of 24 commercial washers, home-made washers, and dipping tanks have been installed up to the present time. Two of the largest size commercial washers manufactured by one company were purchased in 1930 and used during the harvest

season by two growers in the Indiana apple section. In many cases it will undoubtedly result in co-operative operation of such machines where the grower has only a few thousand bushels, or in his using a dipping tank or home-made washer.

Dipping Tank Operating Costs

Costs of operating dipping tanks, home-made and commercial washers have been obtained from various sections of the country for 1930. One particular grower from New Jersey using a dipping tank which he constructed himself from $30.00 worth of material was able to wash 500 bushels per day. His cost of operation for washing 2,000 bushels was estimated at 2½ cents per bushel.

Construction of home-made paddle-washers which can handle 60 bushels of fruit per hour will cost from $185.00 to $250.00 depending upon the grade of material used according to Prof. Harry C. McLean of the New Jersey Agricultural Experiment Station. A washer of this type, used by Mr. A. R. Kohler of Woodbury during the 1930 season, washed approximately 14,000 bushels of fruit according to Professor McLean. Cost of material excluding labor and miscellaneous material amounted to $185.00.

The cost of operating this outfit was as follows:

Charge of washer for season (depreciation	$100.00
Cost of acid	10.00
Cost of Rinsing	60.00
Interference due to trouble with rinsing equipment	25.00
Total	$195.00

No power cost was included as it was operated from the grader and required no separate power unit. The cost for washing according to these figures would be approximately 1.4 cents per bushel. Cost of depreciation is probably higher than customary according to Professor McLean as the life of the washer would naturally exceed two years. However, in this case the owner evidently anticipated the replacement of the home-made machine by a commercial washer to handle increased production.

Complete records have been furnished on the cost of using a large washer by Mr. Frank T. Street, manager of the Kentucky Cardinal orchards, Henderson, Kentucky. The figures follow:

Acid, supplies, etc.	$206.37
Analysis	22.04
Electricity	169.70
Supervision	250.00
Depreciation	548.46
Total	$1,196.57

A total of 50,203 bushels was washed by this machine at an average cost of $0.0258 per bushel. Depreciation was estimated at 30 per cent on the machinery. The average run was 1,625 bushels per ten hour day, although up to 2,200 bushels of large fruit were handled per day while with smaller fruit it was difficult to get more than 1,500 bushels over the same machine in the same length of time.

An interesting comment has been made by Mr. Street on the effect on marketing of the washed apples. "As a result of this washing operation, we increased our sale price ten cents per bushel on bulk apples sold at the plant to truck trade over the sale price of fruit of similar character which had not been washed. In addition to this difference in price the washed fruit had a much more ready sale than unwashed fruit."

The foregoing costs on hand dipping and washing with home-made and commercial washers should provide power company representatives and dealers with the relative merits and limits of the various sizes of washing equipment.

Another type of washer which is of considerable importance especially in vegetable growing sections is the bunch vegetable washer and root washer. Consumers demand clean vegetables and the labor involved in washing them particularly root crops is very large.

One type of bunch washer driven by a ¼-horsepower motor is

(*Continued on page S 12*)

Taking the Kinks out of FARM WIRING

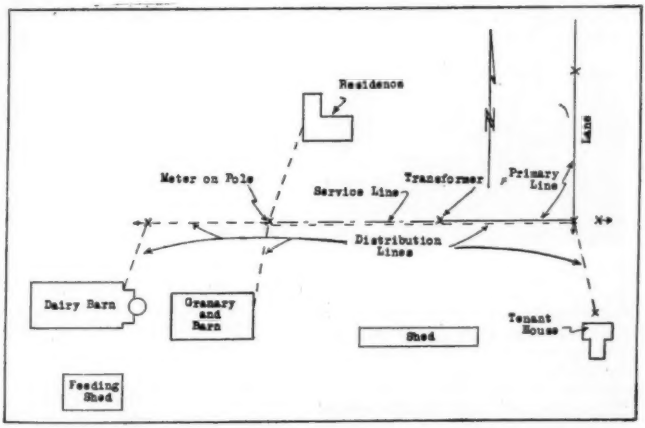
By H. S. HINRICHS

ONE of the most important parts of a farmstead wiring system is the service entrance and meter switch. The following information pertaining to this part of the farmstead wiring system, prepared by Mr. D. E. Blandy of the New York Power and Light Company is typical of the practice followed in many sections of the country.

"The entrance is the electrical doorway to the farm and is the most essential part of the wiring system. It is the neck of the bottle, and it can either hinder or help the farmer in his use of electricity. If constructed of small wires, the use of electric service is limited and the quality of service greatly decreased; if, however, the wires are of the proper size, large enough to carry all of the load at proper voltage and with proper allowance for future uses, electricity can then serve to the best advantage and will become an asset.

"For these reasons, it is strongly recommended that the entrance wires for a farm be not less than three No. 2 B. & S. (Brown & Sharpe) gauge, rubber-covered, double-braid, copper wires, installed in 1½-inch trade size rigid metallic conduit. Conditions on certain farms require much larger entrances, so this is not a hard and fast rule. This entrance will provide for three-wire, 115/230 volt, alternating current service.

"On a very small farm or a rural residence, three No. 4 B. & S. gauge wires installed in 1½-inch pipe may be used. In the very exceptional cases where only the or-



Wiring Layout, Showing Distribution to Various Farm Buildings.

dinary small lighting load will be used, two No. 8 B. & S. gauge rubber-covered, double-braid copper wires can be installed.

"It is unwise to install conduit pipe smaller than 1 inch.

Main Entrance Switch

"For the same reason that the entrance should have large size wires, the main entrance switch should be of large capacity. One without the other is of no value and for that reason nothing less than a 100-ampere, 125/230 volt, unfused neutral, meter test type safety switch is recommended for farm use.

"In exceptional cases where a small entrance is installed, a 60-ampere, 125/230 volt, unfused neutral, meter test type, safety switch can be used. In every case, care should be exercised to see that the entrance, including the main entrance switch, conforms to the requirements of the electric service company.

Pole meter installation of 100 ampere capacity. Load wires extend in all four directions from this pole to various buildings about the farmstead. The use of a single 1½" conduit containing four No. 2 wires, two for line and two for load with a jumper between line and load for the neutral wire have contributed to the economy of this installation.

The latest development in meter installation where one-meter rates are available is to install the same outside the farm buildings, so locating the meter that it is in the center of the distribution system. Meters may be of the outdoor or conventional type, the latter being placed in a box and may be mounted on the outside of buildings or on a pole placed in the farmyard. A few of the advantages of this type of installation are:

(1) Decreased expense in wiring, due to the smaller amount of conduit work required.

(2) Easily accessible for reading by the company.

(3) Decreased voltage drop due to shorter run of wire.

(4) Increased load may be added in outbuilding at less expense."

Several electrical equipment manufacturers are now building a complete line of switches for outdoor meter installations, which combine the switch, fuse and meter (indoor type) in one compact housing. These are available with accessible fuses or not as desired in a wide range of current capacities, meter test blocks or without as required, with safety interlocks, with provision for sealing the boxes and for locking the switch in either on or off position. The cost of such equipment too has reached a point where the saving in wire for the farm distribution wiring, more than compensates for the difference in cost between such pole type switch and an inside switch of similar capacity. In laying out a farmstead wiring system, Rural Service representatives of Power Companies or Contractors will find that such an installation will often give them a flexibility in planning the system not otherwise available.

(Note: Specifications of the Electric Service Company should be secured before making outdoor installations.)

The Three Stages of Man

First Stage—A week-old boy.
Second Stage—A wee cold boy.
Third Stage—A weak old boy.

BOB'S PAGE

Devoted to Merchandising of Electrical Equipment in Rural Communities

Conducted by Robt. J. Fulton

Farming, an Industry

RURAL electrification has now come to the point where we cease to look upon the farm merely as a residence, but rather as a factory with an owner who happens to live on the premises. We must put our efforts not only toward electrifying his residence, but his industry as well.

A farmer signs up for the "high line" for one reason primarily—that is to have light. Perhaps some, but not a majority, use the "high line" for other appliances at the start. It must be clear that the farmer using electricity for a few lights and one or two small appliances would not create a profitable market for the power company.

By looking upon the farm as a factory, we can study the means whereby each farm can be put on a profitable basis, as far as labor-saving machinery driven by various motors, is concerned. Every farmer, after he has the "high line," should next get a water system and then, before thinking of a complete layout of home appliances, motorize his producing department.

The farmer has found that not only does electricity make his home really livable for the first time, but also that by employing it intelligently around the farm he can materially cut his labor costs; in other words, that electricity, intelligently and liberally employed, will represent to him an actual profit rather than an expense. He feels justified in spending today many times as much money on electrical equipment as he would have spent a few years ago.

Enough cash can be saved by using portable motors, feed grinders and other machinery to make monthly payments on the larger home appliances. The feed mill may be taken as an example of saving. First, the farmer has to haul his grain to the mill in town. One ton of grain costs about $4.00 cash to be ground at the village mill. If the village is 5 miles away, you will have to figure 10

Motor H.P.	Recommended Wire Size B. & S. Gauge—Rubber Covered Wire						
	Type RA—Single Phase Type DM—Direct Current				Type PA 2 or 3 Phase Alternating Current		
	32 Volts	110 Volts	220 Volts	440 Volts	110 Volts	220 Volts	440 Volts
1/8–1/6	14	14	14	14	14	14	14
1/4–1/3	12	14	14	14	14	14	14
1/2	10	14	14	14	14	14	14
3/4	6	12	14	14	12	14	14
1	6	10	12	14	12	14	14
1 1/2		10	12	14	10	12	14
2		8	10	12	8	10	12
3		6	8	10	8	10	12
5		4	6	8	6	8	10
7 1/2					4	6	8
10					4	6	8

Wire sizes for motor installations, based on 100 foot distance from power line.

miles of hauling, also the time, labor, gas, oil, and wear on your motor truck, which will be at least $4.00 more. This, added to $4.00, makes $8.00 per ton. With an electrically driven mill on the farm the cost would be about 60c.

Your farmer may say that he does not have the time to stand around and wait until the hopper of feed is ground.

He does not have to stand around and wait, because after he has milked the cows in the morning or has finished the other before-breakfast chores, he can fill the hopper on the mill, turn on the motor, and go in to eat breakfast. By the time he finishes breakfast the feed is ground, and no time is lost. The amount of feed in the average hopper will take the average feeding requirements for one.

A 5 horsepower motor, 1800 R. P.M. and 9 inch pulling, running a hammer mill with blower and cyclone, will do the following:

	Screen	Lbs. Per Hour
Oats	3/32	325
Oats	3/16	700 to 1,000
Barley	3/32	700
Barley	3/16	1,000
Shelled corn	3/32	800
Shelled corn	3/16	1,100
Ear corn	7/16	1,000

The portable motor will hoist hay using a reversing drum at a cost of 1 kw. hour for 3 tons. If 3 H.P. motor is used it takes a little more time. You can unload the average load of hay in 7 minutes with a motor-driven hoist. You can also elevate the grain and run a concrete mixer.

For feed grinding and ensilage cutting, a 5 H.P. motor will do the work to the best advantage.

In elevating corn with a clutch-type jack and a 5 H.P. portable motor, a 50 bushel load of ear corn has been elevated into a 25 foot crib in about 6 minutes.

The average energy required to lift 1,000 bushels of ear corn 1 foot with a drag elevator is about .423 kilowatt hour.

A 3 H.P. portable motor will take care of elevating grain and hoisting the hay satisfactorily. The energy cost for hoisting hay is about 0.05 K.W.H. per ton for each ten feet of lift in the barn. A 5 H.P. portable motor will handle a

Motor H.P.	Recommended Fuse Sizes					
	Type RA Single Phase 60 Cycle 1725 RPM		*Type PA 3 Phase 3 Wire 60 Cycle 1725 RPM		Type DM Direct Current 1725 RPM	
	110 Volts	220 Volts	220 Volts	440 Volts	115 Volts	230 Volts
⅛	6	3	3	3	3	3
⅙	6	3	3	3	3	3
¼	6	3	3	3	3	3
⅓	10	6	3	3	6	3
½	10	6	3	3	6	3
¾	15	6	3	3	10	6
1	20	10	6	3	10	6
1½	25	15	10	3	15	10
2	35	20	10	6	20	10
3	50	25	15	6	30	15
5	70	35	15	10	50	25
7½			25	15		
10			50	25		

Notes—Fuse sizes given above are based on normal voltage conditions.

*These fuse sizes will also hold good for 2 phase, 4 wire circuits; for 2 phase, 3 wire circuits the middle or neutral phase leg should be fused from 40 to 50% heavier than the two outside legs.

Fuse sizes given for polyphase (2 and 3 Phase) will not permit the motor to be thrown directly across the line. For motors up to and including 5 HP use double throw knife switch with fuses in running position only or time limit starters equipped with inverse time limit overload relays or thermal overload cutout elements. For 7½ HP and larger use auto transformer type starter (compensator).

For 32 volt DC motors use a fuse having an ampere capacity approximately 3½ times that given for 115 volts.

The above table indicates sizes of fuses to employ so that your motor installation may be properly protected.

2 roll husker and shredder easily, and even a 4 roll machine if fed with judgment. The cost is about 0.4 K.W.H. per bushel to operate.

On pages S 9 and S 10 are two wiring tables that are recommended for motor installations. The recommended wire sizes will prevent excessive voltage drop from the supply line to the motor and insure an ample margin of safety for overloads.

The function of the fuses in the motor circuit is to prevent damage to the motor windings by sudden or prolonged overloads. It is therefore important that not only the proper type of fuse be selected, but it must be of such size as to carry the starting current for a short time interval without blowing and still afford some protection to the motor after the starting current has subsided.

A. S. A. E. Rural Electric Division Program

Those persons interested in rural electrification and planning to go to the Twenty-fifth Annual Meeting of the American Society of Agricultural Engineers at Iowa State College, Ames, Iowa, June 22-25, 1931, will no doubt be interested in the program of the Rural Electric Division:

June 22— Afternoon 2:00 to 4:00

1. PAPER: "Some Results of Ten Years of Rural Electrification"—Dr. E. A. White, Director, Committee on the Relation of Electricity to Agriculture.
2. PAPER: "Distribution of Electric Service on the Farmstead"—Roy T. Hayman, in Charge of Rural Electrification, Oklahoma Gas & Electric Company.
3. PAPER: Characteristics of Rural Electric Distribution Lines"—C. P. Wagner, Mgr., Rural Service Dept., Northern States Power Company.
4. PAPER: "Threshing Machine Operation with Electricity" —T. E. Hienton, Agricultural Engr., Purdue University.
5. PAPER: "Systems of Electric Water Heating"—Earl G. Nichols, Iowa Railway & Light Corporation.
   Discussion led by A. V. Krewatch, Electrical Engineer, National Rural Electric Project.

June 23— Morning 9:00 to 11:30

1. PAPER: "Irrigation East of the Rocky Mountains"—F. E. Staebner, B. S. Clayton, and G. A. Mitchell, Agricultural Engineers, U. S. Dept. of Agriculture.
2. PAPER: "Orchard Irrigation" —C. E. Seitz, Agricultural Engineer, Virginia Polytechnic Institute.
3. PAPER: "Pasture Irrigation" —F. E. Price, Agricultural Engineer, Oregon Agricultural College.
4. PAPER: "Hay Curing by Artificial Methods"—F. W. Duffee, Prof. of Agricultural Engr., Univ. of Wisconsin.
5. PAPER: "Grinding Roughages with Small Type Feed Mill" —F. R. Jones, Agricultural Engr., Texas A. & M. College.

June 23— Afternoon 1:30 to 3:30

1. PAPER: "Extension Work in Rural Electrification"—S. P. Lyle, Agricultural Engineer, U. S. Dept. of Agriculture.
2. PAPER: "Rural Electrification Extension Work Promoted by Commercial Organizations"—G. A. Rietz, in Charge of Rural Electrification, General Electric Company.
3. PAPER: "Refrigeration of Eggs on the Farm"—P. T. Montfort, Research Agricultural Engineer, Texas A. & M. College.
4. PAPER: "Results of Survey of Research Work in Rural Electrification"—George W. Kable, Research Dir., National Rural Electric Project.
5. Business Session.

J. C. McQuiston Retires from Westinghouse Company

J. C. McQuiston, general advertising manager of the Westinghouse Electric and Manufacturing Company, has announced his retirement effective June 1, 1931.

In his decision to retire from Westinghouse, Mr. Quiston brings to an end a record of continuous advertising administration for one company unparalleled in American history. For 29 years he has been in charge of advertising for Westinghouse Electric during which time the status of advertising and sales promotion, distribution and other allied phases of his profession have gone through as many changes as the electrical industry itself.

In 1920, when the first Westinghouse broadcast was inaugurated on station KDKA, Mr. McQuiston arranged its pioneer program. He has been in general charge of all radio programs for Westinghouse broadcasting stations since that time.

Grading and Washing

(*Continued from page S 6*)

equipped with two sets of revolving brushes which scrub the soil from the vegetables. A capacity of 200 dozen bunches an hour is claimed by the manufacturers. One make of root washer, also motor-driven, consists of a steel drum mounted on a metal frame. This drum rotates eccentrically moving the roots back and forth to remove the soil. Sixty bushels per hour are promised for this machine.

Large Vegetable Units

Another larger type of vegetable washer has a total motor capacity of 27 horsepower. This washer has two sections for washing, one for removing the large amount of soil and the second for the final washing. Belts with wire buckets hold the vegetables as they are carried through the washing units. Such equipment is suited to very large growers or co-operative organizations of growers.

Of particular interest to readers of this article are the following publications. Copies are usually free upon request.

"Market Supplies and Prices of Apples," Circular No. 91, "Removal of Spray Residue from Apples and Pears in the Pacific Northwest," Circular No. 59, "Commercial Handling, Grading, and Marketing of Potatoes," Farmers Bulletin 753, U. S. Dept. of Agriculture, Washington, D. C.

"The Removal of Spray Residue from Apples and Pears," Station Bulletin 234 and "The Oregon Apple-washer," Station Circular 92, Agricultural Experiment Station, Oregon State Agricultural College, Corvallis, Oregon.

"Washing Fruit to Remove Spray Residue in the Hudson Valley," Bulletin No. 575, New York State Agr'l. Experiment Station, Geneva, N. Y.

"Effect of Acid Wash on the Keeping Qualities of Apples," Bulletin 343, Colorado Experiment Station, Colorado Agr'l. College, Fort Collins, Colorado.

"Arsenical Spray Residue and Its Removal from Apples and Pears," Bulletin No. 226, Agricultural Experiment Station, State College of Washington, Pullman, Washington.

Mechanical power-driven equipment discussed in the foregoing article is manufactured by the following companies:

John Bean Mfg. Co., Lansing, Mich.,—fruit graders and washers.

Boggs Mfg. Co., Atlanta, N. Y.,—potato and onion graders.

Cutler Mfg. Co., Portland, Ore.,—fruit graders and washers.

Felins Tying Machine Co., Milwaukee, Wis.,—vegetable washers.

Ideal Grader & Nursery Co., Hood River, Oregon,—fruit washers and graders.

Matthews Conveyor Co., Ellwood City, Pa.,—vegetable washers.

F. B. Pease Co., Rochester, N. Y.,—fruit grader.

The Trescott Company, Fairport, N. Y.,—fruit cleaner and graders.

ELECTRICITY ON THE FARM Brings Quick Action

Truman E. Hienton, Asst. in Agricultural Engineering, Purdue University, recently reported to us a very interesting result from the distribution of ELECTRICITY ON THE FARM, in that it shows that the farmer will take quick action if he appreciates the value of so-doing.

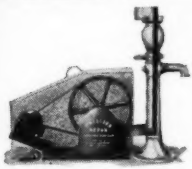
Mr. Hienton writes:

"You will be interested in learning of the effectiveness of this little magazine. An article appeared in the April, 1931 issue concerning the use of electricity in the truck garden in California. This article was read by a market gardener near Indianapolis, who after getting in touch with his power company, has made a similar installation for use in growing early tomatoes out-of-doors. The installation was made on April 13, illustrating that prompt action results in some cases."

Arcturus Establishes Western Office

The Arcturus Radio Tube Company of Newark, New Jersey, manufacturers of radio tubes and photo-electric cells, announce the opening of a Western Division Office at 1855 Industrial Street, Los Angeles, California. Mr. L. P. Naylor, formerly sales manager, will be in charge.

BRILLION-BEVAN



Line of
Electric Farm Equipment

Electric Pumpers
Pump Jacks
Water Systems
Electric Farm Grinders

BRILLION IRON WORKS
Brillion, Wis.

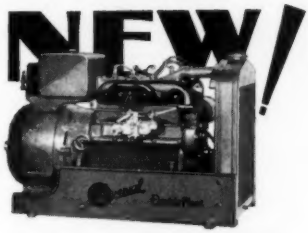
Blue Ribbon Electric Milker

A Portable Milker Requiring No Installation

The "Blue Ribbon" is a self-contained milker, requiring no pipe lines or extra equipment of any kind. It operates direct from the light socket of either high line or farm light plant. A beautiful catalog and complete information will be sent on request. Write us today.

Electric Products Corporation
7 Bluff Ave., La Grange, Ill.

NEW!



The Most Compact Four-cylinder Electric Plants Ever Built. Ultra-smooth.

Here at last is an electric light and power unit providing complete four-cylinder advantages in unusually small space. Ultra-smoothness, flickerless light and steady power are other valuable features.

Series AU—the new Universal Electric Plants are made in stationary, marine and portable types. 1 and 2 KW, 32-110-220 Volts, DC, for use with or without storage batteries. 1½ KVA, 110-220 Volts, AC. Electric starting and remote control as desired. The extreme compactness and low weight of these plants are illustrated by the 1 KW unit, which is only 35¼" x 20⅛" x 15¼" overall, and weighs only 300 lbs.

Series AU adds still further variety to an already large Universal line. Universal now enables you to supply any electric plant requirement from 1 to 35 KW in stationary, portable or marine units. Write for further information and attractive dealer proposition to Dept. 35.

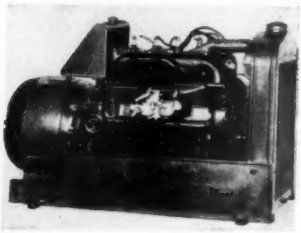
Universal MOTOR CO.
MOTOR CO.

OSHKOSH, WIS., U.S.A.

Universal Announces New Plant Models

A new line of four-cylinder self-contained electric plant models have recently been placed on the market by the Universal Motor Company of Oshkosh, Wis.

In the construction of these units, compactness was one of



New Universal Series AU Standard Type I KW. Electric Plant.

the points desired and obtained by the Builders. The marine unit measures but 35¼ x 15¼ x 20¼ inches overall and weighs but 300 pounds. The electrical parts of the new plants are designed especially for the engine and built as a unit thereof.

These new models will be known as Series AU and are made in 1, 2 and 3 K.W. 32 and 110 volts D. C. The A. C. units are made in 1½, 2 and 3 K.V.A. in 110 and 220 volts.

Master Electric Purchases Airplane for Business Use

The Master Electric Company of Dayton, Ohio, recently purchased and placed in service a four passenger cabin monoplane, especially designed and built for them. The plane was christened "The Master Messenger."

When asked how the new "Master Messenger" would be used, Mr. E. P. Larsh, President and General Manager of the Company, said: "We have always endeavored to provide a service to customers that is the utmost in efficiency. That is where our new company airplane will function. It will expedite the delivery of rush orders, assist Master executives in hurried business calls to all parts of the country, and convey customers to the factory. This plane will enable us to give an ultra-modern service that will reflect the progressive spirit of our industry and typify the efficiency of our products and service."

Trade Literature Received

Clipmaster Catalog—The Chicago Flexible Shaft Company of Chicago, Ill., have issued a catalog illustrating and describing their clipping and shearing machines, including their two models of Clipmaster.

Kohler Electric Plants—A four-page folder entitled "Protection Against Light Failures," issued by the Kohler Company of Kohler, Wis., emphasizing the adaptability of their electric plant for emergency installations. Models available for either alternating or direct current, 220 or 110-volt service.

Buffalo Forge Ventilating Unit—A four-page illustrated folder describing the "Buffalo" 8-inch home ventilating unit, manufactured by the Buffalo Forge Company, Buffalo, N. Y., The unit is neat and attractive in appearance and provided with a motor of unique design, having no switches, brushes or starting mechanism to get out of order or interfere with radio reception.

Wagner Squirrel Cage Motors—A bulletin just issued by the Wagner Electric Corporation of St. Louis, Missouri, entitled "Squirrel Cage Motors," discusses and compares seven distinct types of squirrel cage motors, as to their starting torques, starting currents and cost. Speed torque curves and tables are employed to make the comparsion understandable to the motor purchaser.

COMING MEETINGS

NATIONAL ELECTRIC LIGHT ASSN. Annual convention City Auditorium, Atlantic City, N. J., June 8-12, 1931.

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS. Twenty-fifth national convention June 22-25, 1931 at Iowa State College, Ames, Iowa.

NATIONAL ASSN. OF FARM EQUIPMENT MANUFACTURERS. Thirty-eighth annual convention October 21-23, 1931 at Chicago, Ill.

OHIO STATE SHORT COURSE. State Short Course to be held at Ohio State University, Nov. 5, 6, 7, 1931.

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS. (North Atlantic Sec.) F. L. Rimbach, Chairman, Rural Electrification Comm.; O. B. Stichter, Secy. Next meeting at New Brunswick, N. J. Date to be announced later.

Myers Stages Big Sales Campaign

Not only have the F. E. Myers & Bro. Company, of Ashland, Ohio, manufacturers of water systems, increased their consumer advertising this year, but they have also inaugurated a very vigorous sales campaign among their water system dealers and distributors.

The purpose of the campaign, like all other sales campaigns, is to build up interest in the sale and installation of power pumps and water systems among the dealers and distributors. The campaign is built largely around a very elaborate portfolio which bears the following significant title: "Open the Faucet Wide, and Let The Stream of Dollars Flow Into Your Pockets."

This portfolio, in addition to selling the qualities of Myers' products to the salesmen and distributors, furnishes them with a great fund of information which should prove helpful in selling water systems. As an example, it discusses, among many other subjects, the topic, "Who are the Prospects for Running Water, and Where to Find them."

In addition, attention is called to the many national and state publications in which Myers' advertising is carried regularly. These include, among others, the following: The Country Gentleman, The Saturday Evening Post, The National Geographic Magazine, ELECTRICITY ON THE FARM, Poultry Tribune, Capper's Farmer, Outdoor Life, American Poultry Journal, The Farm Journal, The Country Home, Successful Farming, Field & Stream, The American Home, House Beautiful, Better Homes & Gardens, Home & Field, House & Garden, Country Life, Breeders Gazette, Fortune, American Fruit Grower, Farm Trade Guide, The Farmer's Wife, The Household Magazine, Hoard's Dairyman, Market Growers Journal, Fruits & Gardens, Better Fruit, Farm & Ranch, Pennsylvania Farmer, The Progressive Farmer, Idaho Farmer, Ohio Farmer, Michigan Farmer, Oregon Farmer, Washington Farmer, Rural New Yorker.

To enable the local distributor or dealer to build business in his territory by local newspaper advertising, specimens of newspaper copy are supplied. Topical window displays are also illustrated, and instructions given in use of water system demonstrator sets.

The campaign was inaugurated with a sales meeting of Myers' representatives held at the Congress Hotel in Chicago early in April.

Place the Meter Where It Belongs— at a Price the Job Can Afford

For rural customers the meter should be installed outside. That's where it belongs. And "Utility" Meter Boxes are priced to make them practical on any job. Thousands in use.

"UTILITY"

Meter Boxes and Meter Service Switches

are so designed that the contents are easily accessible for reading and testing. Weatherproof, permanent, and easily mounted, they are adaptable to a wide variety of installation requirements.

INTRODUCTORY OFFER

We shall be pleased to send samples for inspection and trial without any obligation on your part. Write today for complete illustrated catalog.

F. D. KEES MFG. CO.

BEATRICE, NEBR.

Announcing

ELECTRIC FARM EQUIPMENT DIRECTORY and SALES MANUAL

Following the suggestion made by the N. E. L. A. Farm Equipment Committee, ELECTRICITY ON THE FARM announces for publication in the early fall an ELECTRIC FARM EQUIPMENT DIRECTORY AND SALES MANUAL. This handy reference book will serve as a gold mine of helpful information on what and where to buy.

This Directory will contain a complete classified listing of manufacturers of electrically-operated equipment for farm service. It will also have vital facts and sales data on every possible application for electricity on the farm, classified under eighteen headings for ready reference, so that farm equipment salesmen may have the answer to any question they're asked.

Who Can Use the Directory

(1) Rural Service salesmen of power companies.
(2) Managers of merchandising or rural service departments of power companies.
(3) Power company demonstrators.
(4) Hardware and implement dealers.
(5) Electrical contractor-dealers.
(6) Equipment jobbers.
(7) College rural service leaders and rural electrification project directors.

All of the above distribution factors will have daily use for this Directory. Subscribers to ELECTRICITY ON THE FARM with MERCHANDISING SUPPLEMENT will automatically be sent a copy of this handy reference book or copies may be purchased for $1.00 each. Companies needing copies for a number of representatives are asked to place reservation orders at once, so we can plan the printing run.